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Cupola Operation for Continuous Pouring

A Detailed Statement of Preparation, Schedules, Charges and Materials Handling Costs at an East Moline, Ill., Foundry

BY J. FRANKLIN ERVIN*

The continuous melting of iron in the plant of John Deere & Co., East Moline, Ill., is based on the operation of one cupola continuously throughout a 10-hr. day. The cupola building is located in the center and at one side of a two-story foundry building, 60 ft. wide and 600 ft. long, as described in THE IRON AGE, Jan. 7, 1915. The tapping floor is at the level of the molding floor, which is 15 ft. above grade, and the charging floor is 25 ft. above the tapping floor. The cupola building, 36 x 40 ft., accommodates two 90-in. cupolas with ample additional space for daubing, baking and storing ladles.

The first floor is not inclosed and here the scales are placed for weighing iron, foundry and sprue scrap. The slag from the cupolas is dropped while hot through the tapping floor into a slag ladle on the first floor, while the cupola drop is retained upon the second floor until sorting is complete, when the refuse is then dropped through the tapping floor into a special dumping car in which the refuse is taken to the dump heap.

The tapping floor is reinforced concrete covered with 4 in. of clay. On a mezzanine floor supported by column brackets is the 7200-cu. ft. direct-driven centrifugal blower which supplies air at 16 oz. maximum pressure to the cupolas at the rate of 4500 cu. ft. per min. This floor has space for two

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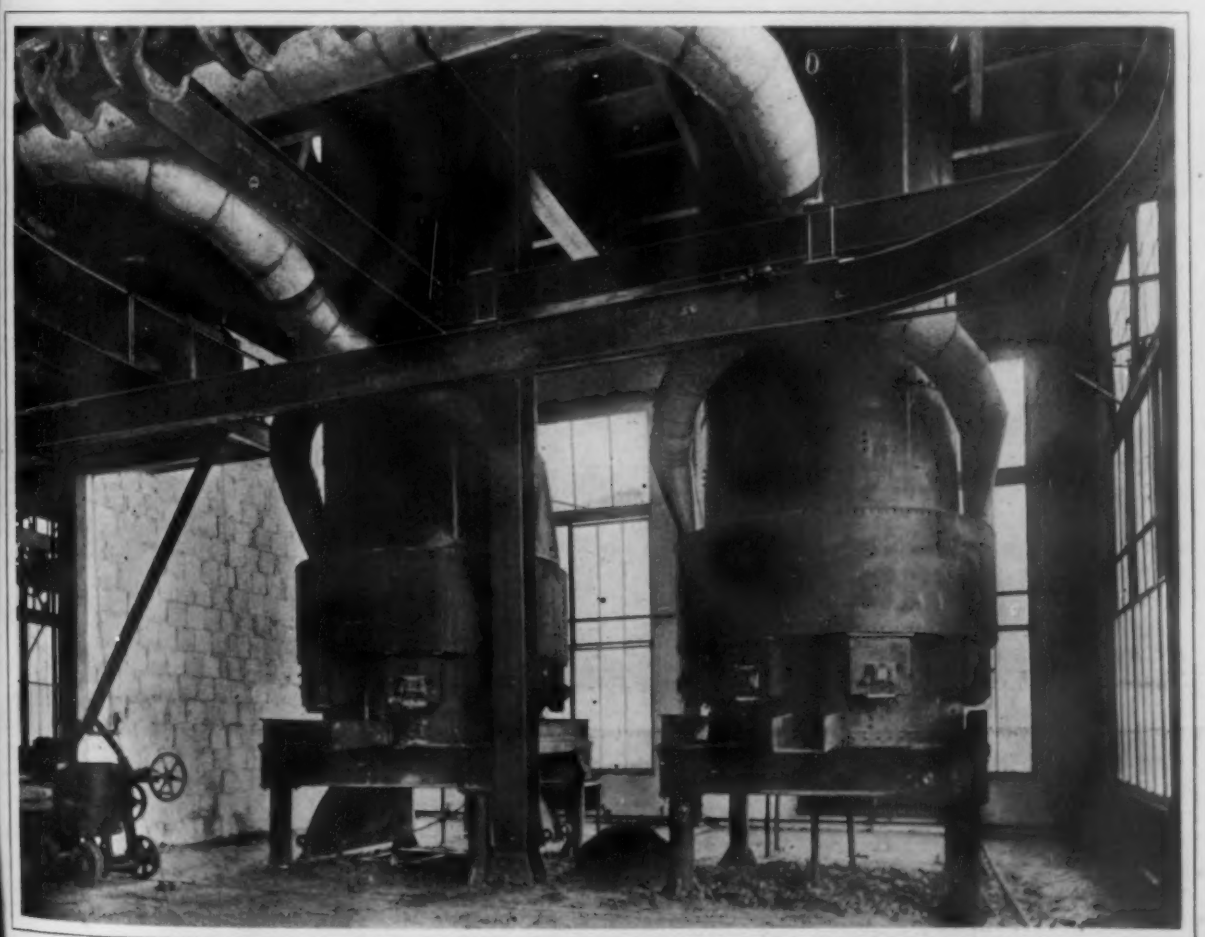


Pouring Level of Two 90-in. Cupolas for Continuous Melting, John Deere & Co., East Moline, Ill.

Charging Level of the Cupolas

such machines and is totally inclosed, so that the air is drawn from the outside of the building, the enclosure being necessary to prevent slag wool from getting into the fan and motor bearings.

The third or charging floor, shown in the second view, is designed for a load of 600 lb. per sq. ft. and is covered with ½-in. diamond rolled, steel plate. The charging floor is served by a 3-ton, electric elevator platform, 5 x 8 ft., which operates at a speed of 100 ft. per min.

CONSTRUCTION OF CUPOLA LINING

The cupolas are installed to melt continuously for a 10-hr. day and produce 70 tons with a 21-in. lining and 130 tons with a 12-in. lining. The foundry is now operating at 72 tons (average) per 10-hr. day, and the continuous melting calls for the operation of each cupola on alternate days.

The cupolas are lined from the bottom to the charging floor with Mitchell extra, cupola blocks. The two outside courses are made up of cupola blocks 6 in. thick, having outside and inside radii of 45 in. and 39 in. and 39 in. and 33 in. respectively. The inside lining is made up of a 9-in. block with an outside radius of 33 in. and an inside radius of 24 in. This additional lining was placed for the reason that the cupolas are designed to feed a foundry 600 ft. long rather than 340 ft., which is the length at present. This inside lining of 9-in. brick will be removed when the building is extended, making a cupola of 66 in. inside diameter fitted with a 12-in. lining applicable for continuous melting. The bricks are laid closely and grouted with stiff fire clay.

The tuyeres are constructed with detachable sections, extending inward from the 12-in. lining. These sections can be removed when the inner lining is removed, which will allow the main tuyeres to remain intact. The tuyeres are a continuous ring with the exception of 12 in. on each side of the slag opening, and the safety tuyeres are in the rear, one on each side of the slag opening. The ratio of tuyere opening to cross-sectional area of the cupola is as 510 to 1800, or the tuyere equals 28.2 per cent of the cupola cross-sectional area.

PREPARATION OF CUPOLA FOR HEAT

Repairs are started on the cupola at 7 a. m. One man is required to clean up the cupola drop, sort the iron and coke, daub and put up the bottom, until 5.30 p. m. The melting zone is daubed with fire clay, about 600 lb. being required for each cupola. The entire melting zone is daubed to approximately 36 in. above the tuyeres. The cupola bottom is made up by sifting the cupola drop through a ½-in. riddle which supplies about two wheelbarrowsful daily for each cupola. These screenings are placed upon the bottom. The greater part is placed at joints between the doors and lining to allow a free vent. The bottom is also made up of two wheelbarrowsful of a mixture of burned molding sand, mixed with silica sand in the proportion of three of molding to one of silica. The bottom is approximately 5 in. thick on the back and slopes to the center and tapping hole, where the thickness decreases to about 3½ in.

The slag hole is 12 in. above the bottom of the bed and is kept open through a 21-in. lining by inserting a cast-iron breast 15 in. deep, 10 in. wide and 18 in. high. This makes a large opening to the slag aperture, thus preventing the slag from chilling and plugging the outlet. The slag hole has a diameter of 1½ in. and is plugged with clay until the cupola is ready to slag, which is about the time the fifth 1-ton ladle is tapped. The tapping outlet is chamfered from the inside to give the appearance of a large funnel and is lined up with fire clay mixed with some clayey molding sand. The total labor cost of cleaning and daubing each cupola per day is equal to 10 hr. for one man at 22½c. per hr., or a total of $2.25 per cupola.

OPERATING SCHEDULE

The daily heat is taken with wind on at 7.30 a. m., and the bottom dropped at 5.30 p. m. The cupola tender and charger begin on the cupola at 5 a. m. by putting in the bottom and starting the charge and fire at 5.30 a. m. This burns during the time of charging up to the door, or 7.30 a. m. when the wind is put on and the cupola tender comes to the tapping floor, taps and slags off, his helper continuing the charging.

The charges are 2700 lb., made up of 1200 lb. of No. 2 foundry iron, 1200 lb. of implement and railroad gray iron scrap, and 300 lb. of foundry scrap, sprues, steel and remelt. Two hundred and fifty pounds of wood is put on the bottom and then 1500 lb. of coke, which makes a bed 36 in. above the tuyeres. This is followed by a charge of 3500 lb. of iron. The second charge of coke is 300 lb., then 250 lb., until the last charge, which is 200 lb. Beginning with the fourth charge, 60 lb. of limestone is charged and continued throughout the entire heat. Limestone charged in this manner equals about 2.2 per cent of the total iron charged. Approximately 375 lb. of coke is reclaimed from the daily drop and is used to fire the ladle oven. The iron is drawn intermittently into 1-ton worm geared ladles which are handled to the molding floor by an electric monorail crane.

COST OF HANDLING MATERIALS

The material yards are arranged with industrial track and yard scales for the weighing of all materials. Flat top, balanced type trucks are used for delivering pig scrap and remelt to the charging floor. Pig iron is handled in 5000-lb. trucks. The weight is taken on the grade floor and the charging is done by pig weight. The sprues are taken up in scoop pans which hold from 400 to 500 lb. each and are charged into the cupola by an overhead trolley which allows the pans to be dumped directly into the cupola. The coarse scrap is handled on flat top, balanced trucks from which it is dumped into the

cupola. Coke is handled to the charging floor in large trucks holding 1350 lb. each from which it is charged to the cupola by hand forking. Limestone is taken up in trucks of 500 lb. each and shoveled to the cupola from the truck.

The total cost of handling materials from the yard to the cupola is 14½c. per ton of melt. Pig iron is received at the yard in box cars and is unloaded and piled by hand at a cost of 6c. per ton. Coke is also received in box cars and is unloaded by wheelbarrows at a cost of 20c. per ton. Scrap is received in gondolas and is unloaded from car by hand at a cost of 8c. per ton.

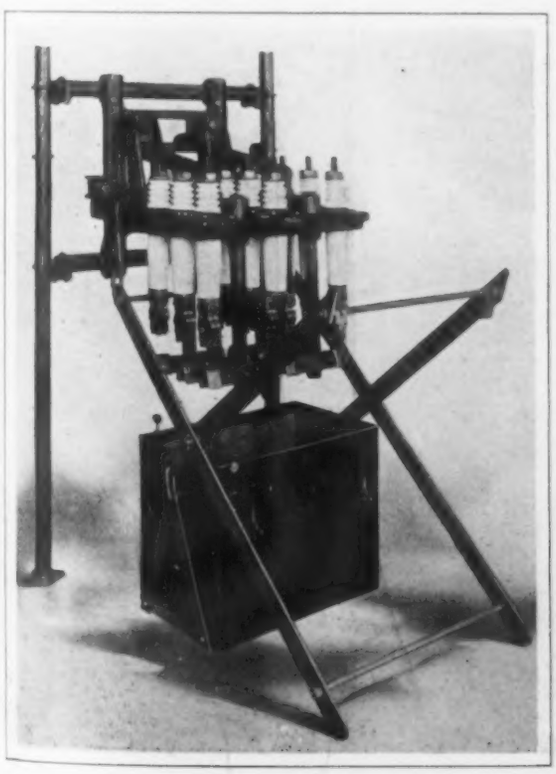
Summary of Daily Labor Cost Per Ton Metal to Molding Floor

Unloading materials per ton metal charged, 72 tons @ 10c.	$7.20
Materials to charging floor per ton metal, 72 tons @ 14½c.	10.44
One man to put in bottom, charge up until wind time, tap out and regulate blast, 12 hr. @ 32½c.	3.90
One man charging, 12 hr. @ 6c. per ton	4.32
One man, repairing cupola, 10 hr. @ 22½c.	2.25
One elevator man and pusher, 10 hr. @ 17½c.	1.75
One crane operator, 10 hr. @ 25c.	2.50
Total	$32.36
Total per ton melt	0.45

Lifting Device for Oil Switch Tanks

The General Electric Company, Schenectady, N. Y., has developed a tank-lifting device for small sized oil switches. The arrangement, which is made in two widths, one for single and the other for double-throw switches, will lift the tank through the entire distance between the switch frame and the floor in either direction.

To fasten the device to the switch frame and lower the tank, two hooks attached to the inner ends of the longer pair of operating arms are placed over the ribs of the switch frame. After this the operating arms are raised and the supports fitted under the tank. The wing nuts that secure the tank to the frame are next loosened and the arms lowered to the floor. Two catches on the cross rod between the inner set of operating arms are then released, and the arms raised until the tank reaches the floor. To replace the tank the operation is reversed.



A Device That Has Recently Been Developed for Lowering and Raising the Tanks Used in Connection with Oil Switches

Gas Turbines Brought to Practical Efficiency

BY C. A. TUPPER

During a visit which the writer paid to the works of Brown-Boveri & Co., in Baden, Switzerland, he learned of experiments which they were making, in a carefully guarded chamber, on the designing of a commercially effective gas turbine. Trials at that time were not wholly successful, owing to the destructive effect of gases at the high temperatures of combustion on the turbine blading and similar difficulty with the valves sticking which prevented the proper operation of the explosion chambers. Recent correspondence, however, indicates that this turbine has finally been brought to a state of practical working efficiency. It is designed and operated on the impulse principle.

In the internal combustion engines of existing types, however, the cylinder is an explosion chamber and power cylinder combined, while in the impulse gas turbine the explosion chamber is separate from the power member. There is a group of bottle-shaped explosion chambers arranged radially around the shaft of this turbine. Each chamber has inlet valves for air and gas and an exhaust valve for the product of combustion. The operation bears points of resemblance to a two-cycle gas engine, and may be described in general as follows:

Air is forced into each explosion chamber in turn. The gas entry valves are then successively opened and gas is also forced in under pressure. When volatile liquid fuel is used a spraying apparatus worked by compressed air, on similar lines to the Diesel engine, is resorted to. As the explosion chambers become filled with the predetermined proportions of gas and air, the mixture in each is fired by electric sparks passing between the contacts placed in several strategic parts of the chamber. On the combustion of the charge the temperature rises sharply, with the pressure closely following. The exhaust valve in the neck of the explosion chamber is then opened and the hot gases are forced out through a conical nozzle similar to that used in the two best known types of impulse steam turbines.

From the nozzle the now cooling and expanding gases impinge on the rotor. A fan keyed on the shaft is placed at the exhaust to assist in drawing the hot gases through the rotor and accelerate the reduction of temperature. When the pressure in the explosion chamber has been spent an independent blast of air is forced through to perform the office of scavenging, as in the two-cycle reciprocating gas engine after the completion of the power stroke. In the case of the turbine, however, the time available for scavenging is longer, and with perfected design the results will undoubtedly be very satisfactory. A fresh supply of fuel is next forced into the explosion chamber and the process continues. The exhaust gases can also be used to raise steam in a small boiler, the steam being used to drive the air and gas pumps, and also for the producer.

A gas turbine would occupy only one-third of the space required for a gas engine of equal power, and will average not more than quarter of the weight; hence a wide field of usefulness will be immediately open to this machine. Even before the outbreak of war it was being considered for aeroplanes and dirigibles, and the first successful trials which come to the attention of the engineering world are likely to be in connection with military service; but such developments may not become well known until long after they have occurred. The commercial exploitation of the gas turbine will in all probability not take place until the readjustment of industry following the conclusion of peace.

The average wage paid union workmen in Wisconsin in 1914 was $705, compared with an average of $683 in 1913, according to the annual statistical report of labor conditions prepared by J. J. Handley, secretary of the Wisconsin Federation of Labor. The figure is based on reports received from 253 unions, or 60 per cent of the total number. The average wage for the metal trades is given at $750.

Shells from European Battlefields

A German Study of the Composition and Structure of Some of the French, English and Russian Projectiles

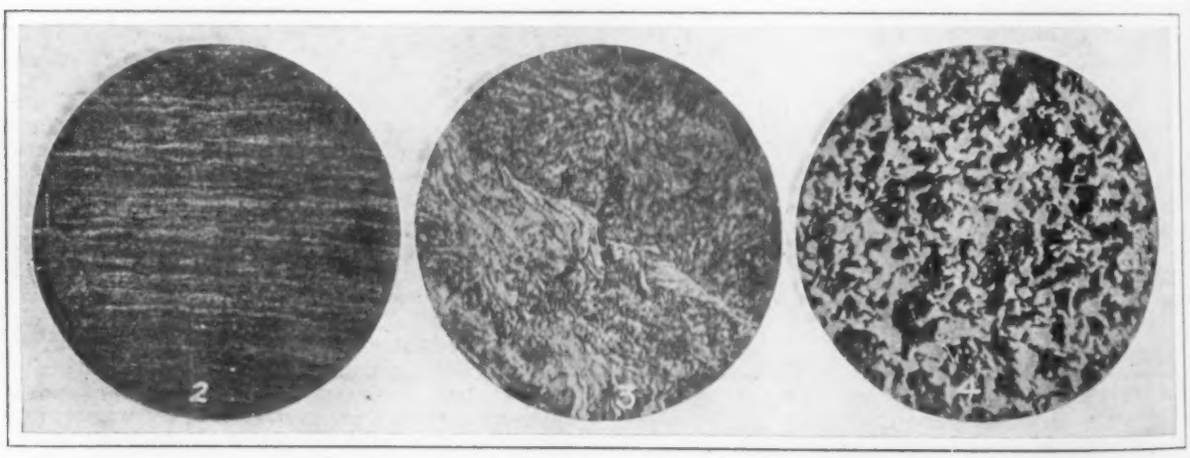
A captain in the German army, who in his academy school days studied metallography, among other subjects, sent to the metallographic laboratory of the Charlottenburg high school a piece of a French shell for examination. The piece, Fig. 1, was smooth, sharp and about the width of a knife, and had the chemical composition shown in the table as sample No. 1. An investigation of its structure revealed that shown in Figs. 2 and 3. There was a noticeably high slag content. The fine structure consisted of close-grained sorbitic pearlite and little ferrite. The high slag and phosphorus content, which would render the material unsuitable for other purposes, was in this case apparently admissible.

An unsigned article in a recent issue of *Stahl und Eisen*, of which the foregoing paragraph is an introduction, gives also a description of some English and Russian shells and shrapnel which the author states were sent to him. The chemical composition of the various pieces is given in the table. The analyses show nothing striking; both alloyed and plain carbon steels are used for such steel shells. Special heat treatment is not applied, for all examinations showed the fine structure that would correspond with the chemical composition and simple cooling in the air, which is the usual practice.

Fig. 1—Splinter from a French Shell

The English shells, Nos. 2 and 3 in the table, as well as the English shrapnel steel, No. 4, consist of ferrite and pearlite. Samples Nos. 5 and 6 were sorbitic, as expected in the case of air-cooled alloy steels. The analyses do not reveal the impurity of the metal; polished surfaces such as Fig. 5, however, show the quantities of slag inclusions, so much so that one might be led to think that he was dealing with wrought iron. Such high slag content was found in all of the first five samples. The uniform manganese content, determined by chemical investigation, and the uniformity of the inner structure established beyond doubt that one was dealing with ingot steel. The slag also did not look like the silica slag of wrought iron, but rather resembled manganese sulphide. Apparently, in the haste necessary in the manufacture, no attention was paid to slag content and besides the impurity did not apparently, in these cases, influence the material as to the purpose for which it was made.

The English shells offer, however, a few good examples for study under large magnification. In Fig. 4 the magnification is 1200 diameters, at which the ferrite and pearlite can be easily differentiated. The crystals are decidedly smaller than one is



Figs. 2 and 3 are Photomicrographs of the Steels in the Piece of French Shell of Fig. 1. The analysis of this steel is given as sample No. 1 in the table. Fig. 4, 1200 diameters, is a photomicrograph of a piece of English shell

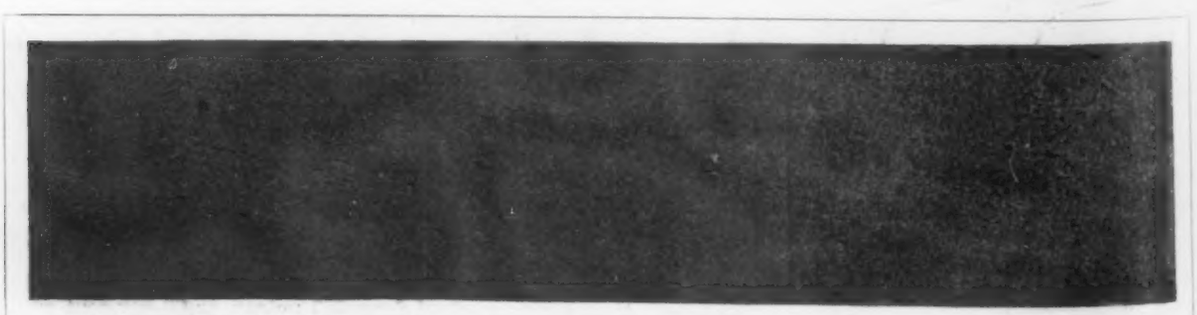


Fig. 5—Slag Inclusions and Streaks in an English Shell, with a Decided Contrast in the Size of the Crystals on the Right with Those on the Left. This photograph is reduced about one-quarter from an original magnification of 35 diameters

accustomed to see in such steels. They show a kind of angular border. The pearlite and the ferrite in many places are intertwined so that one can speak of neither a ferrite nor a pearlite net. Both are uniformly fine grained and worked together, an example of probably extensive mechanical manipulation.

Table of the Composition of Pieces of Shell and Shrapnel

Sample	Carbon, Per Cent	Manganese, Per Cent	Silica, Per Cent	Sulphur, Per Cent	Phosphorus, Per Cent	Chromium, Per Cent	Arsenic, Per Cent
French shell	0.54	0.68	0.32	0.030	1.170	...	0.05
English shell	0.47	0.76	0.31	0.040	0.056	...	...
English shell	0.45	0.76	0.21	....	0.053	...	...
English shrapnel	0.60	0.90	0.07	0.024	0.054	...	...
English shell	0.36	0.70	0.21	0.040	0.034	0.25	...
Russian shell	0.58	0.55	0.24	0.024	0.025	0.16	...

No nickel found in any of the samples.

Fig. 5 shows streaks, from the lower right hand to the upper left hand, parallel with the slag inclusions. In these streaks the grains are appreciably finer than the intervening darker portions. The fineness in the grain can perhaps be a result of still finer, even dust-like, slag than that visible in the illustration. The difference is striking between the grains in the right and those in the left of the reproduced steel. The grains at the right in area are about a thousand times as large as those at the left. One can discern here the effect of the local differences in the drawing out of the metal, caused by the compression of the projectile.

CUPOLA MELTING EXPERIMENTS

Improvements in an Old German Cupola Insuring Satisfactory Results

An interesting article appears in *Stahl und Eisen* on cupola melting. The writer, Oskar d'Asse, had an old cupola on his hands that was not giving satisfaction. In cupola practice the greatest saving in fuel is striven for with good product and the greatest possible output. This is attained through the complete combustion of the carbon to carbon dioxide and the presence of sufficient excess of air to prevent the reduction of this carbon dioxide in the column of the cupola. For this reason the following conditions should be observed.

Large dense coke that offers the smallest possible surface for the formation of carbon monoxide.

Uniform blast with pressure not too high.

Low melting zone, also to avoid the reduction of carbon dioxide.

Great velocity of the ascending gases.

In agreement with these conditions the whole construction of the cupola is arranged, its charging, the shape and section of the tuyeres and the blast.

The chief measurements of the old cupola referred to were: Height, 7300 mm.; diameter, 900 mm.; height to charging door, 4300 mm. There were two rows of tuyeres, the lower 640 mm. from the hearth, and the upper 1000 mm. They were inclined 40 deg. toward the hearth. This cupola did not give satisfactory results, either in regard to output, coke consumption, or quality of material. An improvement was first sought by increasing the number of revolutions of the blower and the amount of blast. Before the change the blower made 280 r.p.m. and gave 94 cu. m. per min.

According to Buzek's formula for each square meter of section in the smelting zone, 100 cu. m. blast are needed per min. For the cupola in question this corresponds to 75.6 cu. m. per min. Allowing 20 per cent for loss, the cupola was receiving enough blast according to this formula. The total tuyere section, four lower and three upper tuyeres, was 805 sq. cm., which equals one-eighth of the cross section at the smelting zone, and was about equal to the section of the blast pipes and openings. Under these conditions, shown in column 1 of the table, the cupola gave cold iron and melted much too slowly. The blast was, therefore raised to 114 cu. m. per min., and the pressure from 17 or 18 oz. to 20.5 oz. per sq. in. The result was a considerably quicker melting. The typical carbon monoxide flame was only seen just after charging the coke. The smelting zone was found to be at its regular height, but the results, shown in column 1 of the table, were not satisfactory.

Table of the Results of Melting Tests

Number of series	1	2	3	4
Number of days	13	3	14	24
Tuyeres, upper, No.	4	5	4	4
Tuyeres, upper, cm.	20 x 8	20 x 8	17 x 7	17 x 7
Tuyeres, lower, No.	3	0	2	2
Tuyeres, lower, cm.	11 x 5	..	11 x 5	11 x 5
Tuyeres, total, sq. cm.	805	800	586	586
Weight of charge in kg.	1,000	1,000	1,000	1,500
Output in kg. per hr.	5,360	4,500	5,227	6,940
Bed coke, in per cent of total iron	2.08	....	2.63	3.28
Charge coke, in per cent of iron charge	13.72	....	12.66	9.40
Total coke, in per cent of total iron	15.8	13.0	15.3	12.7
Limestone, in per cent of iron charge	3.6	....	3.6	4.5
Limestone, in per cent of coke charge	23.0	....	24.2	35.0
Rejections in foundry and cleaning room in per cent of iron charged	1.82	....	2.08	0.99
Temperature of iron	very often cold	hot	good	good
Furnace running	very irregular	too slow	good	good

It was now thought that improvement could be brought about by lowering the melting zone, so the upper tuyeres were blocked up, and a fifth tuyere placed in the lower row, so as to keep the same tuyere area. The coke consumption, as shown in the table dropped to 13 per cent, but the results still left much to be desired. The output was very low, and the carbon-monoxide flame was continuous. A further bad result was that the lining was burned completely through, and the relining took many hours. The former tuyere conditions were, therefore, quickly replaced.

The next tests were made by gradually reducing the tuyere area. The best results were obtained with 586 sq. cm. (see column 3), which equals one-tenth of the cupola section at the smelting zone. The iron was good, the output sufficient, and the carbon-monoxide flame was seldom seen. After the day's run the cupola was clean, and often no patching was necessary. The high coke consumption alone was bad. By gradual amounts the amount of iron in the charge was increased (see column 4). The coke charge was, therefore, reduced in percentage, and, when the charge of iron was 1500 kg., had dropped to 9.4 per cent, with a total with the bed coke of 12.68 per cent, and an output per hour of about 7000 kg. The daily output was 35 tons, and the rejections for a time of 24 days were only 0.99 per cent. Careful chemical tests showed that the iron was very uniform in composition. The coke consumption was recognized as not extraordinarily low, but with denser and harder coke still better results were to be expected.

G. B. W.

The Vilter Mfg. Company, Milwaukee, Wis., ice and refrigerating machinery and Corliss engines, has booked contracts in the past three weeks which require an indefinite continuance of the night and day operating schedule made effective in May.

The Future of Germany's Steel Industry

Economic Possibilities of Changes in the Status of German and French Lorraine and of German Poland

BY H. H. CAMPBELL*

In the last issue of THE IRON AGE it was shown that the Minette district in German and French Lorraine and in Luxemburg furnishes the raw material for nearly seventy per cent of the total iron and steel production of both Germany and France, and about 90 per cent of that of Belgium, thus accounting for more than half the iron and steel made on the continent of Europe. It was also shown that this ore is about equally divided between Germany and France.

It is not easy to put into a few words the movement of ore in Germany, because that country both imports and exports considerable quantities. It imports from Luxemburg and French Lorraine, and it exports to Belgium and France, but these imports and exports just about balance one another. Germany imports something less than 10 per cent from Spain, and about the same amount from other countries; most of it from Sweden, but a little from Hungary. Four-fifths of its total supply comes from Lorraine.

We all know that France has declared its intention of annexing German Lorraine if the allies are successful in this war, and we must consider what the effect would be on the general economic situation if this plan were carried out. There is now free trade in iron ore between the countries of western Europe. France gets a considerable quantity of calcareous ores from Germany to mix with its silicious ores; while Germany gets silicious ore from France to mix with its calcareous ores. Belgium is able to get all it needs because there is a free market, owing to the competition of France, Germany and Luxemburg. If France should annex German Lorraine it might put an export duty on iron ore and make this duty so high that it would be prohibitory, and thus France could monopolize the whole supply, providing, of course, it could control Luxemburg. It might do this merely as an economic measure to build up its steel industry, and it might deny that it was influenced at all by the desire to injure Germany, although the result would be disastrous to that country.

THE HUMAN FACTOR IMPORTANT

It is to be regretted that there is so much ill feeling between these two nations that this desire might play an important part in the situation. Some years ago the writer of this article visited a steel works in German Lorraine which is owned and managed by men who speak French and who employ only French speaking workmen. As soon as he was greeted by the manager of the works, it was evident that it was the proper thing to speak French, but unfortunately the visitor's command of that language was more than limited. Therefore his first question was in his native tongue, "Do you speak English?" The answer was, "Non, monsieur," which was delivered with a courteous smile. The next question was "Sprechen sie Deutsch?" There was no answer in words, but there was a gesture signifying indignation, and a shake of the head as if to say that he did not understand a word. Peace was restored by a simple remark in pitiable French.

Here was a man who for years had carried on a big industry on German soil and who sold his product in that country. When he traveled on the train the guard, acting without doubt under orders, would decline to recognize the French name of the town where he lived. He was in contact all the time with German officials and German people of all classes; yet he could not make any concession to a helpless stranger within his gates and looked upon a few words in the German tongue as a declaration of war. This bitterness must be considered in any solution of the problem.

It is the opinion of many Americans that we should take a vote of the people in Lorraine to find out which country they would prefer to live in. According to the Almanac de Gotha, 74 per cent of the population of Lorraine "speak German as their mother tongue," while 22 per cent speak French, the remaining 4 per cent being Italians and Poles who work as laborers in the factories and mines. In Alsace there are few foreigners and 95 per cent of the total population speak German and 5 per cent speak French. Considering the two provinces as a whole we find 87 per cent speak German and 11 per cent speak French, while 2 per cent are foreigners; so that if France had her way there would be 87 Germans ruled by eleven Frenchmen.

These figures were sent to a French Alsatian engineer and he was asked what he had to say about them. He replied that without doubt a large majority of the people in those provinces do speak German, but he claimed that a great number of those would vote for union with France. This is entirely a matter of opinion; but we can say that so far France has said almost nothing about taking a vote in Alsace-Lorraine. If the Allies should decide that this was the right thing to do, it is to be presumed that a vote would be taken in Egypt, India, Ireland, Finland, Morocco and Constantinople.

CALIFORNIA AS A PARALLEL

It is not an answer to say that Germany took this province away from France forty years ago, for at that time no one considered this ore to be of any great value and very little of it was used for making iron and none at all for making steel. We may compare Lorraine with California. No American wishes to discuss the merits of the Mexican war and the less we say about the matter the better. At the close of that war we demanded and received California, but at that time it was considered of little importance. Soon afterwards we discovered gold there, just as the Germans discovered the value of the Minette ores in Lorraine. We have built up an empire on our western coast and California to-day is not in any sense the California that we took by force and contrary to all principles of justice from a weak and defenceless nation. So Lorraine to-day is not the province that was taken from France in 1871.

Since that time it has become the center of the

*Author of "The Manufacture and Properties of Iron and Steel."

industrial system of Germany, for these Minette ores not only form the basis of its iron and steel industry but also of its agricultural life, for Germany uses the basic slag from its Bessemer converters on its farm land and is thus able to raise a good deal more than twice the quantity of wheat, rye, oats and potatoes to the acre than we raise in the United States. If Germany is able to sustain itself during this war by the output of its own farms, it is because of the use of this slag as a fertilizer. All the world knows of Germany's virtual monopoly of the aniline dye industry and this springs from the manufacture of coke in connection with the operation of blast furnaces. We have a law which limits the process of distraint and prohibits taking away from a mechanic the tools by which he earns his living. Germany might well cite this law at the bar of all the nations if an attempt is made to deprive it of Lorraine.

There is another possibility, for it is conceivable that Germany will dictate the terms of peace and it may be that it will demand a few miles more of French territory. This would give it complete ownership of the Minette field, and it would also give it two-thirds of the iron and steel plants of France. By putting a prohibitory export duty on iron ore Germany could paralyze the whole iron and steel industry of both France and Belgium and possess a virtual monopoly of the steel manufacture in western Europe. It is to be hoped that there will not be a chance to do this, and that Germany would not be so unwise as to ask it if it did have the chance.

It will not do for any nation to try and make unjust demands at the close of this war. Twenty-five hundred years ago Etruria conquered Rome and stipulated in the treaty of peace that Rome should not use iron except for agricultural implements. We know how much good this did and there may be some readers of this article who can not place Etruria on the map. A century ago Napoleon thought he had rendered Prussia helpless by imposing humiliating conditions limiting its military establishment; but we know that these very conditions and limitations created the Prussian army of to-day. If France claims German Lorraine or if Germany claims French Lorraine we may strike the word peace from our lexicon. Such a provision means war. This may come in twenty years or in fifty years; the one sure thing is that it will come and that Europe will see again this struggle of armaments and continual preparations for war. The natural resources of the Minette district are divided now so as to give the nations of Europe a fair share according to their needs and it would be a crime to disturb this equilibrium. Alsace is of little economic importance and the arguments above given do not apply there in the least, but however the war ends Germany should retain Lorraine.

THE FUTURE OF STEEL IN GERMAN POLAND

In the extreme southeast of Germany, in the province of Silesia, there is a district about fifty miles square which has eight steel works, over thirty blast furnaces and nearly 300 puddling furnaces. The local ore supply is scanty and very poor. Some years ago one of the blast furnaces was carrying as one-half of its burden a pulverulent Blue Billy made as a by-product from zinc reduction works having the following composition: Iron, 36 per cent; silica, 50 per cent; zinc, 1 per cent. The fact that such an ore was used at all shows that good ore can only be had at very high prices; most of the ore is imported from Hungary and Sweden.

The district possesses one advantage in a supply of cheap coal, which is well adapted for heating furnaces and for boilers, but which does not give good coke. The coal bed extends from the province of Moravia in Austria through Silesia into Russian Poland. The best coke is made in Moravia, but even here the quality is not good; in Silesia it is worse, while in Russian Poland it is not fit for use in blast furnaces.

The greatest advantage is the supply of cheap labor. For centuries Poland was under the rule of an oligarchy of a few Polish landowners who treated their tenants and workmen almost as serfs, while by misgovernment they made a Mexico out of their country. The condition of the farm laborers and tenants to-day is very bad and the general scale of living is far below that of Western Europe. Under German rule the people have learned the methods of modern agriculture, while German capital and German enterprise have built up industrial enterprises of all kinds throughout Silesia and Russian Poland.

This district has received paternal care from the German Government, which has established low freight rates and has spent a great deal of money in building canals. Silesia profits by the cartel system under which almost all German industries are conducted and thus is able to share in the business of supplying the iron and steel requirements of the German railroads and also in the export trade of the country.

We must now ask what will happen if Poland is made into a separate government. Silesia will find itself surrounded by nations which do not need its steel. It will make more steel than it can use; but Germany, Russia and Austria have all committed themselves to a protective policy, while it will be impossible for Poland to undersell Germany abroad. Moreover, if Silesia wished to export by sea the freight to Hamburg would be very high, while commerce through the Baltic Sea is carried on with great difficulty in the winter. In addition to this, Poland would be without the advantage of the cartel system and would be unable to keep in touch with the markets of the world.

If Poland becomes independent and Silesia is taken from Germany, it will not be a serious blow to the German state. It will be a great loss to the owners of the factories in German and Russian Poland; but it will be a far greater loss to the common people of Poland. Politics will not buy bread.

Compensation to Workmen in Illinois

The report showing the results of operations under the Workmen's Compensation Act in Illinois during the first eighteen months has been made public. Orphans and disabled employees received during that period $1,590,041, the average allowance of $2,081.77 in fatal cases being somewhat larger than if the claims had gone through the courts. Disputed claims of all kinds totaled 2314. Of these 1372 were heard by arbitration committees in Chicago, 456 outside the city and 486 are pending. Undisputed claims, which do not come before the board, and which are being paid, largely exceeded the number of those disputed. Of the $1,590,041 allowed by the board more than $500,000 was paid in instalments to families of workmen disabled by accidents, while $1,000,000 was paid in lump sums for deaths and permanent injuries.

As a part of the report are 200 decisions by the board, which will be useful to lawyers in future proceedings. The board was overruled in only one case, in which the Supreme Court held that employees of railroads engaged in interstate commerce are outside its jurisdiction. The law was amended at the recent session of the Legislature by increasing the weekly benefits for disabled workers from $5 to $6 a week.

Internal Stresses and Quenching Mediums*

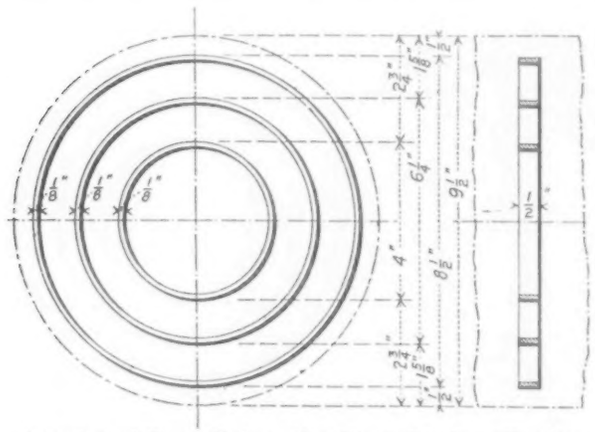
Their Relative Magnitude Determined in Different Portions of a Steel Cylinder—Fiber Stress Greatest When Water Is Used

BY H. V. WILLE

The exact nature of the changes which take place within the critical range, or at the three transformation points of steel, is still a subject of discussion, but it is a matter of common knowledge that profound changes do take place, changes so profound that all of the physical properties are affected. Within this range steel undergoes the following:

1. Loss of the property of magnetism.
2. A pronounced evolution of heat.
3. A distinct change in the rate of increase in electric conductivity.
4. A curious and abrupt change in the linear dimensions.
5. The tensile strength no longer falls with an increase in temperature, but suddenly increases.

These changes all take place at approximately the same temperature, in grades of steel with sufficient carbon to warrant quenching them for the purpose of improving their tensile strength and elongation, and the coincidence of these changes in properties is almost perfect at the critical temperature of an eutectic steel.



Location of Stress-Deformation Rings Cut from Forging

Both the microstructure and the tensile strength, however, are affected by the rate of cooling, and the rate of cooling is in turn governed by the cooling power of the quenching medium and the mass of the quenched objects. The surface of the quenched objects may also influence these properties; Benedicts' experiments, however, indicate that the surface has little influence.

QUENCHING POWER OF A LIQUID

The classical work of Benedicts demonstrates that the quenching power of a liquid depends largely on the latent heat of vaporization, and refutes the views commonly held that it depends upon the initial temperature or the heat conductivity of the medium. The addition of salt to increase the quenching power of water is also proved fallacious, and the experiments of Le Chatelier that the conductivity for heat is no measure of the cooling power of a liquid are confirmed.

Mercury has a heat conductivity of over ten times that of water, but both of these able physicists demonstrate that it is decidedly weaker as a cooling medium. Le Chatelier considers that the specific heat of the cooling medium governs the cooling speed—and this is confirmed by Benedicts—providing the temperature of the body is low, but the latent heat of vaporization is the controlling factor when the temperature of the body is high. This theory is tenable considering the large amount of heat which can be carried off by a relatively small weight of vapor, and accounts for the efficiency of water as a quenching medium.

Water is the oldest known cooling medium for quenching steel. Subsequently, various animal and vegetable oils were employed, and many of the artisans using them are still under the belief that carbon is added to the steel by these liquids and the properties thereby improved. In this country mineral oil, because of its low cost, has almost entirely displaced the animal and vegetable oils, and for many years was used almost exclusively for quenching spring plates and large objects. Water, however, possesses manifest advantages of cheapness, cleanliness, freedom from odor, freedom from fire hazard, and above all, efficiency. It is true that a higher elastic limit, tensile strength and elastic ratio for a corresponding elongation and reduction of area, or a higher reduction of area and elongation for a corresponding elastic limit, can be obtained on a water-quenched steel than can be secured by the methods of oil quenching generally practised. Opposing these manifest advantages is the danger from fractures as the result of the lag in the temperature of the steel.

Table 1—Fiber Stress Due to Rapid Cooling

Difference of Temperature, Deg. Fahr.	Fiber Stress, Lb. Per Sq. In.
1500	270,000
1000	180,000
500	90,000
100	18,000

FIBER STRESS DUE TO RAPID COOLING

Table 1 shows the fiber stress induced by the difference in temperatures between the inside and outside of a heated piece of steel, subjected to rapid cooling. These figures were so startling that several years ago the author made a number of experiments to determine the internal stresses in oil and water-quenched forgings of diameters from 6 to 12 in. In recent years many different grades of oil have been proposed as being more effective than the high flash-test mineral oil generally employed, and which could be used without danger of producing a fracture in the steel, and the experiments were extended to include such oils. Full-size specimens, 9½ in. in diameter, cut from a driving axle, were employed, and a conservative method of cooling was followed such as is used in practice, since it was not the intention to determine the maximum stress obtainable, but simply those which would result under usual commercial conditions of quenching. The quenching mediums employed were water,

*From a paper presented at the eighteenth annual meeting of the American Society for Testing Materials at Atlantic City, June 23, 1915. The author is assistant to the superintendent, Baldwin Locomotive Works, Philadelphia, Pa.

light tempering oil, heavy tempering oil, fish oil and cottonseed oil.

The forgings were heated to 1550 deg. Fahr. and quenched in the foregoing mediums at initial temperatures of 70, 150, 212, 300 and 400 deg. Fahr. Observations were made of the rise of the temperature of the quenching medium and of the time of immersion required to cool the forgings to 600 deg. Fahr.

A series of three rings was then cut from each section as shown in the illustration. These rings were accurately micrometered before they were detached and were again accurately measured after detachment from the forging and the fiber stress calculated from the deformation of the rings. From the illustration it will be noted that ½ in. of metal was first removed so that the first ring represents the fiber stress ½ in. from the surface of the forging, the second ring gives the result 1⅝ in. from the surface and the third ring 2¾ in. therefrom. The detached ring in all cases increased in diameter, showing that ½ in. under the surface the fibers were stressed in compression.

The explanation is simple. If a cylindrical object is heated to 1500 deg. Fahr. and suddenly quenched in some cooling medium, the surface contracts so that the outer fibers are in tension and the inner fibers in compression. It is interesting to note that the volume of all the cylinders was decreased by quenching. The fiber stresses induced by the different quenching mediums are given in Table 2.

GREATEST STRESSES INDUCED BY WATER

This table shows that the lowest fiber stresses are induced by the heavy tempering oil very generally used, and these stresses are never above the elastic limit of the material. The greatest fiber stresses are induced by water, and the immersion temperature appears to have but little influence in ameliorating the internal stresses. It must also

Table 2—Fiber Stresses Induced by Different Quenching Mediums

Temperature of Medium, Deg. Fahr.		Time of Immersion, minutes	Fiber Stress, Lb. Per Sq. In. at Distance from Surface of		
Before Quenching	After Quenching		½ in.	1⅝ in.	2¾ in.
Quenched in water:					
70	210	13	42,600	29,500	16,500
150	boiling	22	46,800	15,300	3,100
212	boiling	22	40,200	51,000	15,700
Quenched in light tempering oil:					
70	330	12	42,300	16,800	4,500
150	374	21	40,500	10,800	2,800
212	435	22	17,650	15,300	4,600
300	410	28	12,890	12,990	6,000
400	fire	23	18,330	16,200	....
Quenched in heavy tempering oil:					
70	330	12	24,000	5,100	6,250
150	405	22	23,500	16,200	10,500
212	400	22	17,400	12,600	750
300	445	30	24,000	22,500	11,600
400	460	30	2,460	.....	9,750
Quenched in fish oil:					
70	334	12	39,200	26,100	15,000
150	385	20	23,500	16,200	10,500
212	440	21	27,900	9,090	11,250
300	430	25	30,600	13,980	15,100
400	428	30	29,100	10,560	21,750
Quenched in cottonseed oil:					
70	338	12	30,300	17,700	12,000
150	375	18	25,410	4,200	15,600
212	440	22	26,800	11,100	15,000
300	410	25	19,840	18,240	18,600
400	448	25	16,230	12,480	.....

be remembered that the pieces were not rapidly cooled in the water, and that they were withdrawn when they attained a temperature of about 600 deg. Fahr. so that the stresses were reduced by slow cooling from this temperature. Stresses can be produced by water quenching equal to the calculated stresses given in Table 1, simply by increasing the rate of cooling. It would be unsafe to increase these stresses beyond those produced in the water-quenched specimens, notwithstanding the fact that the tensile properties would be increased thereby. The analysis of the steel used was as follows:

	Per Cent
Carbon	0.41
Manganese	0.55
Phosphorus	0.036
Sulphur	0.024
Silicon	0.023

(The original paper gives the physical properties of test bars cut from specimens, quenched in the different quenching mediums.)

These internal strains are the primary cause of internal fractures and their magnitude is clearly dependent on the rate of cooling, but they are aggravated by segregation of impurities or any inequalities in the structure of the steel. A forging made from a perfect bloom can be fractured, if the rate of cooling is sufficiently rapid.

The rate of cooling also depends upon the chemical composition of the steel, and Doctor Benedicts' experiments show that a high-silicon steel has a very much lower rate of cooling than the usual grade of low-silicon steels. It has been observed that the high-silicon steel is more amenable to water quenching than low-silicon steels, but this has been attributed to the fact that such steels are generally denser, more uniform and more free from segregation than the low silicon steels. The properties no doubt influence the superior results obtained by water quenching this grade of steel, but the primary cause must be sought in the fact that such steels have a lower rate of cooling, and the internal stresses are therefore less than in a similarly quenched low-silicon steel.

CONCLUSIONS

The results of these experiments are as follows:

1. That the tensile properties of water-quenched steel are superior to those obtained by quenching in any other of the usual quenching mediums.

2. The internal stresses induced in a water-quenched object are of much greater magnitude than those developed by quenching in any other of the usual quenching mediums.

3. They confirm the laboratory experiments of Doctor Benedicts, that the efficiency of the quenching mediums is not dependent to a marked extent on the initial temperature of the cooling mediums.

4. With but few exceptions, which can no doubt be explained by some inequality in the steel, the induced internal stresses are affected by the initial temperature, except in case of water.

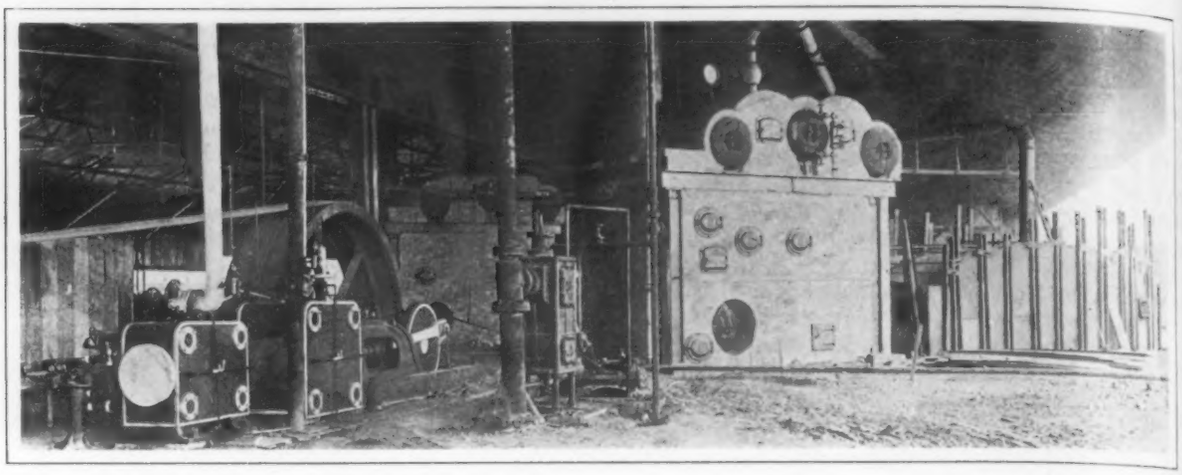
5. Internal stresses induced by quenching in water are independent of the initial temperature.

6. The small difference between the temperature of the cooling mediums, before and after quenching, confirms Doctor Benedicts explanation that large quantities of heat are carried off by the latent heat of vaporization.

7. Light oils have a greater quenching speed than heavy oils but not markedly so. A good tempering oil, however, should be free from tar and should not become thick from the precipitation of the burnt tar.

Producing tungsten powder of remarkable fineness is the claim of a patent granted to Robert Rafn of Porsgound, Norway. The production of amorphous tungsten powder by the reduction of tungsten trioxide is usually difficult because a crystalline product more often results. The inventor claims that by making the reduction in two stages a fine powder is obtainable. The first reduction is with ammonia gas at a red heat producing the so-called blue tungsten oxide; the second is with hydrogen at a cherry-red heat.

Heating Furnaces at Right, with Waste-Heat Boilers; Finishing Mills Engine at Left



New Rolling Mill Near Salt Lake City

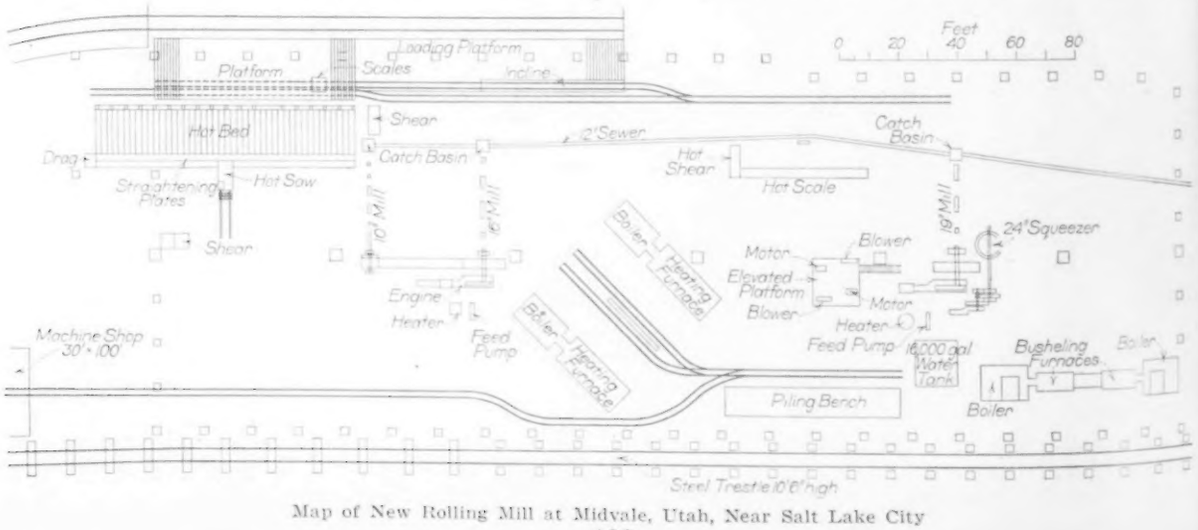
Bar Mill at Midvale, Utah, to Utilize Iron and Steel Scrap Not Needed for Non-ferrous Smelters

A rolling mill to produce general merchant and reinforcing concrete bars has been under construction for several months at Midvale, about twelve miles south of Salt Lake City, Utah, and at this writing is substantially completed. It represents an expansion of the business of the Utah Junk Company, or more accurately, perhaps, a new venture by the principals in the Utah Junk Company—Nathan Rosenblatt, Simon Rosenblatt and Morris S. Rosenblatt. Besides being located to meet a demand now supplied chiefly by shipment from without the State, it also has been projected to utilize a considerable volume of iron and steel scrap material which is particularly well suited to melting and re-rolling into bar products and yet not wanted by the smelters of the district. The consumption of scrap as a fluxing medium in the smelting operations and the utilization of the remainder of the scrap by the new mill is regarded as a happy solution of the problem of readily absorbing scrap of a wide range. Another consideration affecting the venture is the existence of relatively cheap fuel. It is estimated that on the basis of three shifts, the mill will produce 2500 tons a month. It is likely that a $500,000 corporation, to be known as the Utah Iron & Steel Company, will be formed to operate the mill.

The accompanying drawing gives a general plan of the new mill. The main building is 360 ft. long and 128 ft. wide for the greater part of its length. It contains busheling furnaces and heating furnaces, and in both cases waste-heat steam boiler installations are provided to utilize the products of combustion for steam raising purposes. The mills are accordingly driven by steam engines. There are two busheling furnaces, as indicated, and a 260-hp. Stirling boiler in each case. This has its own firebox so that coal may be burned in the boiler itself when a furnace is not in operation, or to supplement the furnaces if the waste heat is insufficient. Near the busheling furnaces is a squeezer, driven by an 18 x 24-in. Porter-Allen engine and a 19-in. muck bar mill direct-driven by a 26 x 48-in. Rarig Corliss engine. The 19-in. mill is composed of two stands, three high, and there is a jib crane for changing rolls.

The finishing mills comprise a combination 16-in and 10-in. mills with three stands of 16-in. rolls, three high, and four stands of 10-in. rolls, three high. As indicated, the heating furnaces are located near these mills and also arranged with respect to the piling bench so that the charges for the heating furnaces may be pulled up on the tracking shown to the heating furnaces. A telpher system takes the product from the heating furnaces to the finishing mills.

Each heating furnace is a four-door construction and the waste-heat boiler provided with each



Map of New Rolling Mill at Midvale, Utah, Near Salt Lake City

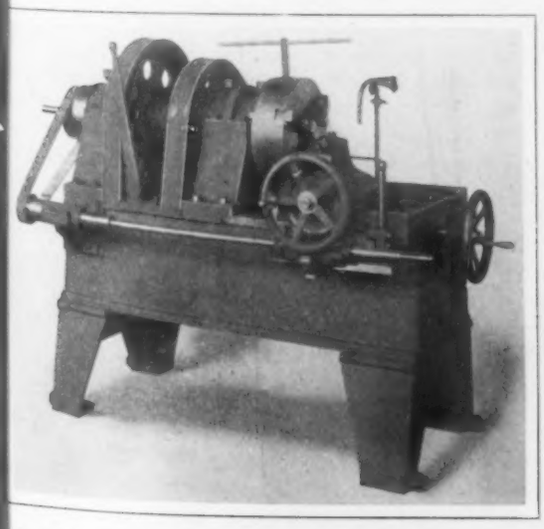
nace is a 210-hp. Stirling boiler. The finishing s are driven by an 18 and 28 x 36-in. Lane & lley Corliss engine, direct connected to the 16- mill and belted to the 10-in. mill. The location the hot bed and shipping platform, alongside of ch is a siding from the Oregon Short Line, is ficated. Immediately beyond the mill is a ma- ne shop, the equipment of which includes a 650 steel hammer, planer, two lathes, drilling ma- ne, etc.

ecial Shrapnel Cutting-Off Machine

A special cutting-off machine designed for fac- the bottom or closed end and cutting off the ged end of 4½-in. shrapnel shells has been ught out by the Williams Tool Company, Erie . This machine is built exceedingly strong to thstand the severe work and for the rapid produc- n for which it is intended, its strength being in- ated by its weight which is 3800 lb. as compared h a standard pipe machine of same capacity ich weighs 2500 lb. It is stated that it is equally ll adapted for facing a forged shell or a shell de from steel bar stock. Government specifica- ns usually require that a cross sectional area of forged shell be left for breaking so that the frac- e may be inspected and this prevents the use of aw for cutting off a forged shell.

This machine has a massive bed with a pan cast ide to catch the chips and cutting lubricant. The adstock bearings are very strong to assure idity and have length to prevent heating and to duce wear to a minimum. The gears are machine t and of coarse pitch and the pinions are of steel. e spindle, which has a 5⅛-in. bore, is extra heavy d strong to prevent chatter. An adjustable stop fitted to the inside of the spindle to facilitate e quick setting of the work. An extra heavy ree-jaw universal chuck designed especially for tting-off work is fitted to the spindle by a flange cured by keys and bolts. The carriage is very rong, being stiffened by cross ribs. Underneath is securely gibbed to the ways and has a small ount of travel along the ways by a screw and ndwheel. The tool block is massive and slides on ways across the carriage. The tool is fitted to e edge nearest the chuck and is held firmly by a eel cap secured by extra heavy studs.

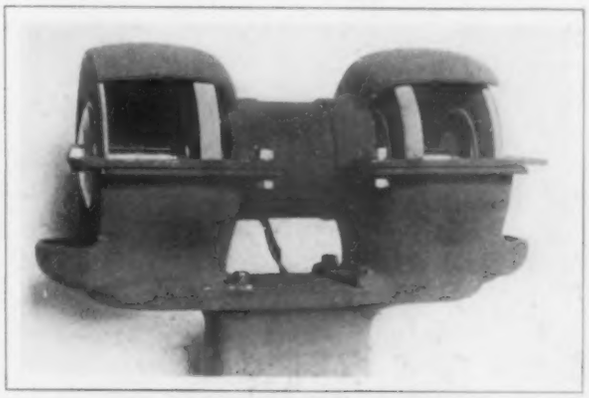
There are two speeds controlled by a friction tch. It is pointed out that this is a decided ad- ntage in the facing operation for when the cut is half finished the speed can be doubled to make the cutting on the smaller diameter more rapid. If desired, a two-speed countershaft can be furnished, giving four speeds. Both hand and power feed are provided, the power feed being operated through a worm gear. The machine has an automatic knockout that can be set to stop the feed at any desired point. Based on a cutting speed of 60 ft. per min. this machine will face a 4½-in. forging in less than 2 min. and cut off the open end, providing the wall is ⅜ in. thick in slightly less than ½ min. It can be used for 5-in. shell forgings by providing a slightly larger spindle. The company has just designed a machine of similar type for 3 and 3½ in. and for 7 in. shells.



Special Machine That Has Been Developed for Facing the Closed End and Cutting off the Ragged End of 4½-In. Shrapnel Shells

Special Grinding Pattern Shop Machine

Forbes & Myers, Union Street, Worcester, Mass., have brought out a new grinding machine for use in pattern and other woodworking shops. Both bench and floor styles are made, the top of the stand of the floor type and the grinding head, which is the same in both kinds, being shown in the accompanying illustration. A special feature of the machine is the use of four wheels, one with a flat face and the other three with round faces for tools having grooved cutting edges.



A Grinding Machine for Pattern and Other Woodworking Shops Having Four Wheels for Sharpening Both Plane and Curved Edge Tools

The machine is driven by a squirrel cage induction motor which is wound for use on two or three phase alternating current circuits only. The capacity of the motor, which is fully inclosed as a protection against dirt and mechanical injury, is ½ hp. Frequencies of 25, 50 or 60 cycles can be used, the speed being 1500 r.p.m. on the 25 and 50 cycle circuits, and 1800 r.p.m. with the 60-cycle current. The wheels are protected by malleable iron guards and the tool rests have adjustments in two directions. Ball bearings, which have grease lubrication, are used, double grooved covers being relied upon to prevent the entrance of dirt and grit.

One of the wheels is designed for grinding chisels and other plane tools and has a flat face 1 in. wide. The other three wheels have round faces for gouges and other special cutters. The face widths of these wheels are ¼, ½ and 1 in., the diameter being the same in all four cases, 10 in. If desired other shapes of wheels can be furnished to meet the requirements of particular cases.

It is reported that an antimony refinery is being built at Harbor Industrial City, Cal., with a capacity of 1500 tons per month. Ore is to come from desert claims in southern California.

SEATTLE INDUSTRIAL EXHIBIT

How Local Manufacturers Maintain a Selling Institution

A selling project has been launched by the Manufacturers' Association of Seattle in the form of a permanent display of Washington-made products. The Manufacturers' Exhibit and Exchange, as it is locally called, covers 17,500 ft. of ground floor space in Seattle's newest structure, the Stuart Building, and on the second floor of the Henry Building, immediately adjoining. These business properties together with the White Building, have a frontage of 345 ft. on Fourth Avenue and 111 ft. on University and Union Streets. Within a short time the second floor of the White Building will be used for display purposes, thus giving the association something like 30,000 sq. ft. of floor space.

The Manufacturers' Association is 16 years old. For years the organization's work was more or less of a routine nature. A salaried secretary performed the usual duties of the average secretary. The association held its usual meetings, annual banquets and like gatherings. Usual questions were handled in the usual way, but lack of sales results eventually made it imperative that something be done to market Washington products in competition with outside goods.

Section of Exhibit, Mezzanine Floor, Stuart Building, Seattle

Section of Exhibit, Second Floor, Henry Building, Seattle

When the permanent exhibit idea took hold the Metropolitan Building Company was approached. This concern holds a lease on State land controlled by the University of Washington. The property consists of 10 acres in the midst of an active business area. It was first intended to have a small building erected for the exclusive use of the Manufacturers' Association, but the company offered to place the exhibit in the Stuart Building, an 11-story structure then in course of erection.

THE IDEA OF COMMUNITY NIGHTS

Twenty-five thousand people attended the joint opening of the Stuart Building and the Manufacturers' Exhibit and Exchange. Two weeks later a parade and street carnival brought 50,000 people to the exhibit. The pavement was specially waxed for dancing and indoors the visitors were entertained with music, motion pictures and demonstrations.

At frequent intervals the association holds a "Community Night." The residents of a state section of the city are guests. Various local or ganizations are often featured, the visitors puttin on their own lectures, luncheons and social affairs Every Thursday afternoon there is a public concer in the association's own auditorium. Every Satur day there is a motion picture show featuring educa tional, scenic and industrial films, but with a little comedy.

SOME OF THE EXHIBITS

One of the largest displays is that of the Amer can Radiator Company showing boilers and radia tors. The Seattle Construction & Dry Dock Com pany, owner of one of the largest industrial plants on the Pacific coast, shows various products and a model submarine now in course of construction will be placed, it is stated, in the company's exhibit. The Seattle-Astoria Iron Works are showing a crimp ing machine by use of which cans are sealed without soldering. The S. T. Johnson crude-oil burning equipment, in charge of P. A. Costello, is another popular display. A third is the "iceless icebox" shown by the Automatic Cooler Company, the device being simply a water circulating method whereby food is preserved at an even temperature without ice.

The Westerman Iron Works are showing a car of the type used in handling rock on the Cascade tunnel project. C. J. Young Iron Works are showing blocks and tackle. Planer knives are shown by the Baty Knife Company, cutter heads by the Philbrick Cutter Head Company and the Smith Cannery Machines Company; shields for steam and hot-water radiators by the Pacific Radiator Shield Company; scales and coffee mills by the Pacific Scale & Supply Company, nestable culvert by F. T. Crowe & Co; cans by the Seattle Can Company; window fixtures by the Anderson Brass Fixture Works; door plates and locks by the Art Hardware & Mfg. Company; gears by the Western Gear Works, and instruments by W. & L. E. Gurley, who have a Seattle branch. The F. S. Lang Mfg. Company has a line of stoves and ranges for wood or coal and equipped with gas-burning attachments also. The Peake fireplace radiator is shown by the American Fireplace Company.

POLICY REGARDING EXHIBITS

It is the policy of the association to sell floor space to local concerns only. No objection is made

wever, to manufacturers of goods or equipment de outside of the State if their product is not plicated locally.

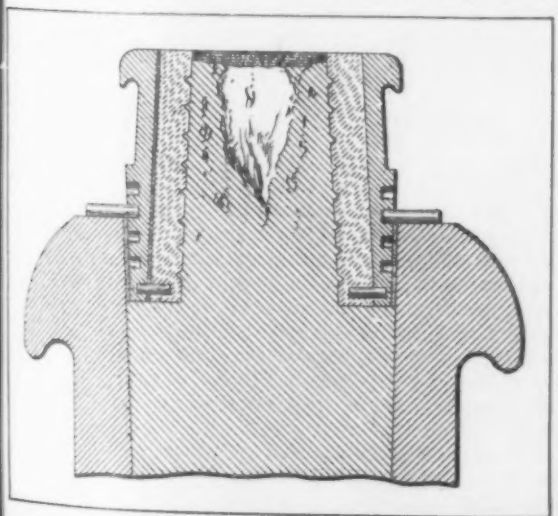
The association has contracted with each daily wspaper for the regular use of advertising space. addition it is using three good trade publications d also issues its own house organ, the *Exhibit ws.* It has its own men on the floor of the exbit and exchange to look after visitors, get them touch with exhibitors and otherwise assist in e actual sale of goods.

Space is sold on a square foot basis according to cation. Some of the booths or spaces are as small 4 ft. square. There are also showcases which ve been divided into small compartments for tive stones, curios, optical goods, etc., and finally, r printers, engravers and photographers, a large mber of small easel and wall spaces are in use.

Non-Conducting Sinkhead for Ingot Molds

A method of making steel ingots free from ging with the use of non-conducting ingot mold gs, forming a sinkhead, is the subject of a patent (U. S. 1,137,144—April 27, 1915) granted to Edward Kenney of Johnstown, Pa. The purpose of nonnducting tops on metal ingots—to provide a reserir of molten metal—has been restricted, says the tentee, because of the excessive cost of the tops, hich are ordinarily made entirely of non-conductg material such as fire brick and which have had be bulky. To overcome these objections, metal sings inclosing and supporting a cheaper maerial, such as loam or dry sand, have been used. such cases, however, it has been customary to low all ingots so cast to become cold and to reove the top before charging the ingot into a heatg furnace. To avoid this and the necessity of aving an excessive number of metal casings on and, the patentee uses a metallic casing which rves as a mold for preparing the jacket of loam other non-conducting material and also as a reforcing shell to protect the non-conducting loam acket. This protection enables it to be handled afely in the operation of drying the loam and setng the top on the ingot mold. After the steel is oured into the ingot and sinkhead, the non-conducting lining being now held by the steel, the etal casing is easily removed and used over again.

The process also renders it possible to cast ingots of various weights or lengths by setting the on-conducting sinkhead top at various heights in he ingot mold, as shown in the illustration, resulting in considerable convenience and economies in making ingots for various purposes, especially rails.

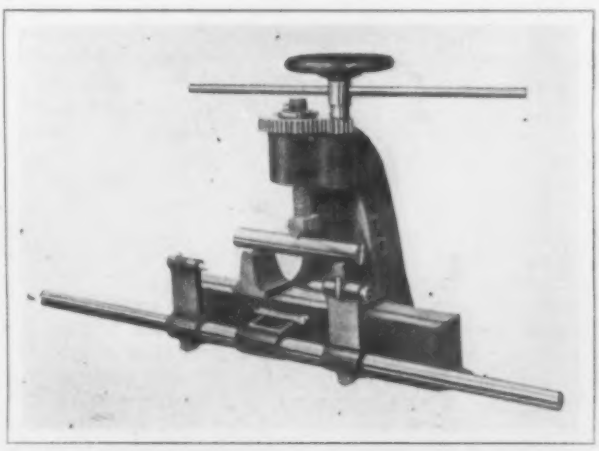


The Kenney Non-Conducting Ingot Mold Top as a Sinkhead

The patentee states that his method renders it possible to remove the metal casing and leave the non-conducting jacket on the sinkhead. The value of this consists in the fact that it quite frequently happens that ingots are delayed in charging into the soaking pits, which would spoil the ingots from which the non-conducting jacket had been removed.

Arbor and Shaft Straightening Press

The P. A. Geier Company, St. Clair Avenue and Fifty-first Street, Cleveland, Ohio, has brought out a new size arbor and straightening press. It is designed for use in forge shops and by engine builders for straightening line and crankshafts. The maximum size of round shafting which the press will handle is 3 in. in diameter and up to 52 in. long. In addition, it can also be used for handling crankshafts where the length does not exceed 52 in. and the throw is not greater than 5 in. The pressure is applied through gearing and the application of a force of 100 lb. at the end of the hand lever will deliver approximately 50 tons at the thrust block.



A Geared Straightening Press for Handling Cold Stock up to 3 In. in Diameter and 52 In. in Length

The pinion and gear mounted on the head of the press drive the pressure screw. Open-hearth steel is used for both of these and the pinion has 15 teeth, 1⅜ in. wide, while the gear has 48 teeth, 1¼ in. wide, the pitch in both cases being 6. The gear, which is 1¾ in. thick at the hub, is keyed on a cast-iron nut which fits into the head of the press and serves to drive the pressure screw, which is 2 in. in diameter, and is cut with a 4-pitch Acme thread. The pressure on the end of the nut is taken care of by a hardened steel ball race, having an external diameter of 4 in., in which steel balls ½ in. in diameter are placed.

The V blocks are mounted on a machine-finished bed and can be moved along a slot milled in the bed for this purpose. These blocks are 5 in. high. If it is desired to handle shafts exceeding 52 in. in length, special centering shafts to take greater lengths can be supplied. The press is mounted on casters so that it can be moved from place to place readily and weighs 725 lb. when ready for service.

The National Erectors' Association has established a branch office at Milwaukee, in charge of H. R. Brady, with headquarters in the Builders & Traders' Exchange, 456 Broadway. There is no discrimination between union and non-union workmen, and the prevailing scale of wages is the same as the union scale, or 62½ cents per hour.

RADIATION PYROMETERS

Sources of Error in the Féry and Thwing—A Study by the Bureau of Standards

WASHINGTON, D. C., July 20, 1915.—The marked development in the construction and use of pyrometers, based on the use of total radiation from hot substances, recently induced the Bureau of Standards to make a study of the subject, as a result of which a report has been prepared by Dr. George K. Burgess, chief metallurgist, and Paul D. Foote, assistant physicist. It embraces a brief account of radiation pyrometry, in which special attention is given to the sources of error, including the various factors which influence the indications of radiation pyrometers, the object being to suggest to users various practicable methods of controlling errors and promoting the highest possible accuracy. The investigation has been limited in the main to those types of instruments which are portable and which are in general use as pyrometers, especially in the temperature control of the various processes involved in iron and steel manufacture, alloy foundry work, smelting, steam generation, etc.

The bureau's investigation has demonstrated that when adequately calibrated and correctly used there are available several trustworthy instruments of the radiation type having many advantages in practical use. It has also been made clear that the radiation pyrometer is subject to many influences which seriously limit the accuracy of its readings unless proper precautions are taken. In the use of radiation pyrometers the various sources of error include lag, resistance of thermocouples and variation in resistance with temperature of the source, effect of dirt and oxidation upon the condensing device, effect of size of image of source and the temperature of the receiver.

LAG AS A SOURCE OF ERROR

When a radiation pyrometer is exposed to the radiation from a source at a constant temperature, the pyrometer does not immediately indicate the temperature of the source, but exhibits a certain time lag during which the receiving system is heating up. Eventually the receiver emits or loses by conduction, radiation and convection as much heat as it receives, and a condition of equilibrium is maintained between the source and the receiver. Theoretically this condition is reached only after an infinite time, but it is possible to construct a pyrometer so that for all practical purposes this state of equilibrium is attained within a few seconds, although few pyrometers show such good behavior.

As an illustration of lag effect, the behavior of a Féry pyrometer No. 108, one of the earlier forms of the gold-mirror thermoelectric instruments, may be cited. This pyrometer was sighted into a black body at a temperature of 1335 deg. C. At least 10 min. was required for the instrument to reach this maximum temperature indication. Thus, if the reading had been taken after an exposure of 1 min. to the radiating source, the observed temperature would have been 1300 deg. C, or in error by 35 deg. C. A very much greater error would be incurred for a 30 sec. exposure. A Féry pyrometer No. 109, sighted upon a furnace at a temperature of about 1313 deg. C. showed a maximum reading of 1313 deg. C. in 20 sec. The time required for this pyrometer to reach its maximum indication is satisfactory, but the instrument showed a defect, which is quite common in radiation pyrometers, namely, a rapid decrease in the emf. immediately following the maximum emf. Thus, for an exposure of 20 min. the temperature reading has dropped from 1313 to 1305 deg. C., the real point of equilibrium being reached after 20 min. exposure.

It would be possible to calibrate this pyrometer so that the correct temperature would be indicated after 20 min. sighting upon the radiating source. With this particular instrument, however, it is better to make the calibration for general use for a 20 sec. exposure, and, if necessary, corrections may be applied whenever in actual use longer exposures are required.

In general, the Thwing radiation pyrometers are very quick acting because of the simple type of re ceiver employed. The Féry pyrometers are compli cated by the focusing device. These mirrors, which are very essential for the convenience of focusing and operation, may cause considerable trouble. No generali zations can be drawn as to the magnitude of the lag for the various types of pyrometers. Apparently no two pyrometers of the same type are constructed ex actly alike. If a radiation pyrometer is to be used for highly accurate work, the effect of lag should be thor oughly examined, so that the calibration and all read ings may be made with an exposure for which the change of lag with time is a minimum.

RESISTANCE OF THERMOCOUPLES AND ITS VARIATION

If the radiation pyrometer is to be used with a galvanometer it is desirable that both the resistance of the thermocouple and its variation in resistance with the temperature of the source be small. These conditions are well satisfied by all the radiation pyro meters examined. The emf. developed by the thermo couple on open circuit when the pyrometer was sighted upon the furnace at any definite temperature, and the potential drop across the resistance connected to the couple terminals, were measured by a potentiometer.

The resistance of the couples of Féry mirror pyro meter No. 111, Thwing cone pyrometer No. 120, and a Brown pyrometer were found to be about 0.8, 0.6 and 0.2 ohms respectively, with variations from these values of 2 to 3 per cent for a range in temperature of the source of 500 to 1200 deg. C.

EFFECT OF DIRT AND OXIDATION ON THE CONDENSING DEVICE

Whipple has observed that a slight film of oxide on the surface of the concave gold mirror of the Féry or Foster radiation pyrometers does not seriously alter the amount of radiation reflected (9.6 per cent), as the greater part of the energy exists in the form of long wave lengths, which the tarnished mirrors reflect with out difficulty. This statement has frequently been interpreted to mean that in spite of dirt accumulation, stains and scratches, the gold surface remains un changed in its reflecting power, but obviously such con stancy is not the case. Pyrometers subjected to severe use in steel mills and other industries soon become coated with dust and dirt.

To ascertain the errors to be expected from this source an experiment was made with a Féry mirror thermoelectric pyrometer No. 108, which was calibrated first in the condition received and, second, after the accumulation of dirt had been removed from the mirror. The case was not exceptional, as many other instru ments have been received which were just as dirty. The difference in calibration with clean and with dirty mirrors varied from 100 to 160 deg. C. in the tempera ture range 600 to 2000 deg. C. Since the ordinary calibration of the pyrometer is made with clean mir roms, the instrument as used with dirty mirrors may read too low by over 100 deg. C.

The effect of dirt upon the surface of the aluminum cone of the Thwing pyrometer has not been tested, but without doubt the calibration would be altered in a manner quite similar to that observed in the case of the Féry pyrometer.

EFFECT OF DISTANCE AND SIZE OF SOURCE

The simple geometrical optics of a radiation pyro meter indicates that the readings should be independent of the distance from the pyrometer to the radiating source, provided the uniform source were of sufficient size required by the constant aperture of the instru ment. Enlarging the size of the source above this lim iting value should produce no effect. Actually this ideal condition by no means obtains, and herein lies the most serious error to which radiation pyrometers are subject.

The causes for the dependence of the readings of a radiation pyrometer upon the distance from the instru ment to the radiating source are two in number, (1) atmospheric absorption and (2) construction of the pyrometer. The errors due to atmospheric absorption

are small in comparison with those occasioned by an unsatisfactory construction of the pyrometer. The effect of atmospheric absorption is to diminish the reading of the pyrometer as the distance to the source is increased.

THE TEMPERATURE OF THE RECEIVER

It is usually assumed that the temperature of the hot junction of the thermocouple does not vary much from that of the room in which it is used. This assumption is approximately true in the case of some pyrometers; for example, the Thwing; but with certain very instruments this temperature may rise very considerably. The temperature of the cold junction of the thermocouple receiver is, in general, closely that of the room, and should change very little. Hence, if the temperature-emf. relation to the thermocouple is known, the temperature of the hot junction or receiver for any furnace temperature may be determined from the emf. developed.

The errors in calibration of a pyrometer as a result of entirely neglecting the temperature of the hot junction of the thermocouple are small, only a few degrees at the most in the range from 500 to 1500 deg. C. The question has been considered here mainly because of the general impression that the effect of the temperature of the hot junction of the thermocouple must necessarily rapidly decrease with increasing furnace temperature.

The Bureau receives a large number of pyrometers, for test and standardization, from various technical industries located throughout the country. Heretofore this testing required about three days for a single instrument on account of the difficulty in heating a furnace to an exactly uniform temperature. A new method has now been developed which permits a satisfactory standardization of a radiation pyrometer within one hour. W. L. C.

Carbon, Nickel and Manganese Steels Compared

The effect of small quantities of manganese upon the physical properties of annealed steel is fairly well known. Up to about 2 per cent, each 0.01 per cent of manganese increases the tensile strength by about 160 lb. per square inch. This statement introduces a paper by Robert R. Abbott, metallurgical engineer of the Peerless Motor Car Company, Cleveland, Ohio, presented at the spring meeting at Buffalo, June 22 to 25, of the American Society of Mechanical Engineers. Its title is "A Comparison of the Properties of a Nickel, Carbon and Manganese Steel Before and After Heat Treatment," and in general the paper gives a comparison of the physical properties, both in the annealed and heat-treated state, of three steels of the same carbon contents, the first of which is an ordinary carbon steel, the second a nickel steel, and the third a manganese steel containing 1.6 per cent manganese.

Test bars of each kind were quenched from slightly above the upper critical points and were then reheated, or drawn at varying temperatures from 300 deg. Fahr. to 1300 deg. Fahr. The results of these tests are given in the form of charts for comparison. The elastic limit, maximum strength, reduction in area, elongation and Brinell hardness are compared. Equations are developed, giving these results in terms of the temperature of draw. Tests were then made comparing the effects produced upon the physical properties by quenching from various temperatures above and below the upper critical points. These results are given in the form of charts.

The conclusions of the paper state that in the three steels under comparison, it required three times as much nickel as it did of manganese to give the same increase in physical strength. In the unheat-treated steels, the increase in strength was not accompanied by a decrease in toughness; rather the reverse. In the heat-treated steels this increase in strength was accompanied by an increase in toughness, with the nickel steel, while with the manganese steel it was accompanied by a decrease in toughness.

United Steel Company Blast Furnace and Other Additions

The plan of the United Steel Company, Canton, Ohio, to build a blast furnace to furnish basic pig iron for its steel plant, which became known a year or more ago when a site was acquired for that purpose, will be carried out in the near future. Pickands, Mather & Co., Cleveland, have become interested in the project and a new company to be known as the United Furnace Company will be organized shortly to build and operate the blast furnace. This company will be controlled jointly by the United Steel Company and Pickands, Mather & Co., but the operation of the blast furnace will be under the management of Pickands, Mather & Co., who will also have charge of the construction of the furnace and the placing of all contracts in that connection. This furnace will furnish Pickands, Mather & Co. an additional outlet for their Lake Superior ore. In connection with the blast furnace forty-seven Koppers by-product coke ovens will be installed to provide a daily coke making capacity of 400 to 500 tons. A benzol plant may also be erected but a definite decision will not be made on this for some time. Plans for the blast furnace are being prepared by Julian Kennedy of Pittsburgh. The furnace will have a daily capacity of 400 tons and 75 per cent or more of its output will be consumed by the United Steel Company. The remainder will be sold in the open market.

The United Steel Company is at present enlarging its capacity by the erection of an additional 65-ton open-hearth furnace, making eight open-hearth furnaces in all, and it will be ready for operation about Sept. 15. The company is also adding a 15-ton Heroult electric furnace, which will be completed about Nov. 15. This will be the second Heroult furnace in the plant, a 6-ton furnace having been installed about two years ago.

Efforts are being made at present to secure an adjustment of freight rates so that the Canton blast furnace will not be at a disadvantage as compared with Youngstown. At present the rate on coal from western Pennsylvania to Canton is 25c. higher than the rate to the Youngstown district. The United Steel Company, which is closely affiliated with other important manufacturing interests in Canton, specializes in the manufacture of vanadium and other alloy steels, a very heavy demand for which has developed from the automobile trade in the past few years. F. H. Snyder is president of the company; E. A. Langenbach, vice-president; Harry R. Jones, treasurer and general manager, and E. L. Hang, secretary.

Snyder Electric Furnace for Brass Melting

The Chicago Bearing Metal Company of Chicago, Ill., has contracted with the Snyder Electric Furnace Company, Chicago, for the installation of a Snyder electric furnace for melting brass. This furnace will have a 12-hr. capacity of 5000 lb. It is to be installed under guarantees as to operating cost and loss by volatilization. Losses by volatilization in oil-fired furnaces form one of the largest melting expenses.

The Allis-Chalmers Mfg. Company, Milwaukee, Wis., has been obliged to extend its working schedule at the West Allis main works because of pumping engine demand. The recent bookings include three pumps for the city of Cleveland, Ohio, and five pumps for the city of Chicago. The pattern shops are working overtime and other departments are expected to go on full time as the work comes along. Work is also progressing satisfactorily on the contract from Bethlehem Steel Company for machining operations on shrapnel.

An error was made in THE IRON AGE of July 1 in giving the names of the officers elected at the annual meeting of the Burden Iron Company, Troy, N. Y. James A. Burden was elected president, Williams P. Burden, vice-president; Daniel W. Tallcott, manager; Robert Forrest, secretary and treasurer; William E. Millhouse, assistant manager, and James D. Keith, manager of horseshoe sales department.

MACHINE TOOL EXPORTS

May Shows a 200 Per Cent Gain—A Doubling Up in Eleven Months

WASHINGTON, D. C., July 20, 1915.—The total value of exports of metal-working machinery including machine tools, rose 200 per cent in May and nearly 100 per cent for the eleven months ending May compared with the corresponding periods of 1914, according to statistics compiled by the Bureau of Foreign and Domestic Commerce. Exports of machinery of all kinds, however, increased but 5 per cent in May, while for the eleven months ending May there was a loss of no less than 21 per cent. Eliminating the exceptional figures relating to metal-working machinery, these statistics are in close harmony with the general trend of our foreign shipments, which show enormous gains in foodstuffs, exceeding the total increase in our domestic exports. The effects of the war are clearly reflected in the machinery statistics, but substantial encouragement is to be found in the fact that the figures for May show gains in seven items of general industrial importance.

The statistics showing exports of machinery presented in the table below are unusually interesting. The total exports in May, which amounted to $10,269,134 as compared with $9,780,752 in the same month of 1914, would have shown a 25 per cent decrease but for the phenomenal gain recorded in metal-working machinery which constituted more than one-third the total exports of machinery during the month. Other items which gained substantially in May as compared with the corresponding month of 1914 include steam engines, all other engines and parts of, milling, paper mill, shoe, textile and sawmill machinery.

The total exports of machinery for the eleven months ended May declined about $23,000,000, and but for the extraordinary increase in the item of metal-working machinery the loss would have exceeded $35,000,000. Never in the history of our foreign trade has any single item in this group made the surprising showing accorded to metal-working machinery for this period, which constituted approximately 30 per cent of the total. The following table shows the total exports of machinery for May, 1914 and 1915, and for the eleven months ended May, of the two years:

Exports of Machinery	May		11 Months Ending May	
	1914	1915	1914	1915
Adding machines	$164,300	$44,947	$1,549,726	$424,216
Air-compressing machinery	35,953	34,186	516,976	342,776
Brewers' machinery	32,248	3,716	318,366	102,772
Cash registers	335,994	100,747	4,410,461	1,232,700
Parts of	*a*	11,698	*a*	101,773
Cotton gins	18,486	6,431	156,939	41,424
Cream separators	51,980	33,533	350,195	189,244
Elevator and elevator machinery	91,096	66,696	1,197,266	753,467
Electric locomotives	52,368	4,164	324,755	253,389
Gas engines, stationary	28,419	20,713	359,371	291,548
Gasoline engines	844,017	393,079	6,238,612	3,932,865
Steam engines	298,081	423,952	4,958,848	2,570,799
All other engines	59,682	68,824	882,047	726,991
Parts of	271,792	366,867	3,149,648	2,574,907
Laundry machinery, power	38,866	25,537	462,971	257,328
All other	66,492	12,079	553,508	196,849
Lawn mowers	39,743	21,091	369,953	264,187
Metal-working machinery (including metal-working tools)	1,235,590	3,762,567	12,931,549	24,427,406
Meters, gas and water	*b*	24,514	*b*	279,424
Milling machinery (flour and grist)	98,326	273,905	1,059,253	1,274,283
Mining machinery	665,574	.....	8,799,646	.....
Oil-well machinery	*c*	25,463	*c*	1,786,992
All other	*c*	384,684	*c*	3,955,154
Paper-mill machinery	40,957	69,703	607,302	676,714
Printing presses	142,370	105,302	2,281,709	1,257,481
Pumps and pumping machinery	328,007	241,224	3,412,547	2,250,008
Refrigerating and ice-making machinery	75,964	65,021	903,333	567,744
Sewing machines	991,860	569,863	10,469,882	5,659,396
Shoe machinery	87,867	136,574	1,399,055	1,117,322
Sugar-mill machinery	157,423	138,084	2,404,340	1,922,273
Textile machinery	86,521	164,376	1,458,037	1,407,264
Typesetting machines	221,123	12,093	1,911,757	642,799
Typewriting machines	913,618	538,451	9,758,057	4,521,264
Windmills	99,456	81,520	1,514,171	646,585
Wood-working machinery, sawmill	75,127	83,634	584,435	286,546
All other	143,343	81,804	1,257,589	608,274
All other machinery and parts of	1,999,139	1,827,092	19,874,935	15,954,922
Total	$9,780,752	$10,269,134	$106,454,239	$83,596,713

a Included in cash registers in 1914.
b Included in all other machinery in 1914.
c Not separately stated in 1914.

The following table shows the total domestic exports for the eleven months ended with May:

Exports	11 Months Ending with May 1914	1915
Crude materials for use in manufacturing	$759,872,342	$478,957,613
Foodstuffs in crude condition and food animals	126,408,965	481,110,384
Foodstuffs partly or wholly manufactured	272,765,411	406,373,144
Manufactures for further use in manufacturing	342,932,683	317,216,854
Manufactures ready for consumption	666,873,742	698,257,553
Miscellaneous	6,725,422	70,117,866
Total domestic exports	$2,175,578,565	$2,452,033,414

Three important factors are embraced in the above table: first, a very heavy decrease in the exports of crude materials for use in manufacturing; second, an enormous increase in foodstuffs, both crude and manufactured; third, a slight gain in exports of manufactures ready for consumption, which now appears for the first time in the 1915 totals. Comparing these figures with total imports of $1,516,474,000 for the eleven months ended May, 1915, it is apparent that the so-called "favorable trade balance" will probably exceed $1,100,000,000 for the full fiscal year.

It will be noted that gas and water meters, formerly included in all other machinery, are now separately reported; also that oil-well machinery has been segregated from mining machinery and that parts of cash registers are separately reported. W. L. C.

Experimental Use of Charcoal Pig Iron

Referring to recent sales of Lake Superior charcoal pig iron, Rogers, Brown & Co., Cincinnati, say in their market report of July 17: "Lake Superior charcoal iron continues up with the leaders in tonnage. Many of the new orders for this iron seem to be placed by foundrymen who are taking advantage of slack times and low prices to do some experimenting on improved mixtures preparatory to the approaching rush years, when their time will be entirely taken up in an endeavor to make promised deliveries."

The Bay View (Milwaukee) mills of the Illinois Steel Company are now operating at 75 per cent of capacity, a gain of 15 per cent since March 1. Specifications are increasing and the working schedule is gradually being extended.

CARE IN MELTING ZINC*

What Was Learned From an Investigation in Defective Battery Zincs

A recent investigation has proved the radical influence which the details of the method of manufacture of zinc, as for electric battery service, exert upon the practical value of the metal in service. In the course of routine tests, two shipments of zinc were received and on analysis were found to be within the specification limits, or nearly so, and the shipments were approved. It developed in service, however, that there was a marked difference

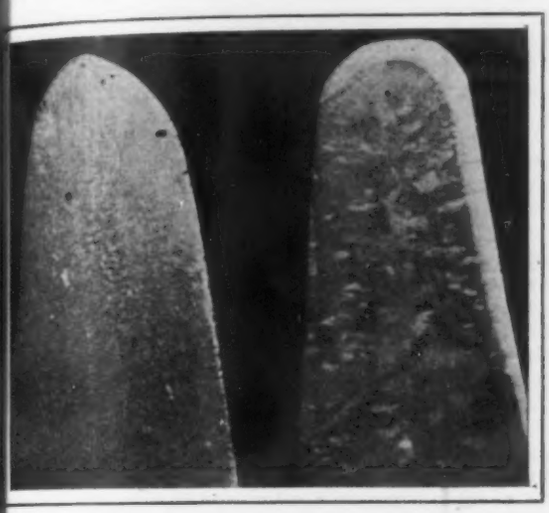


Fig. 1 Fig. 2

Sections of Zinc Plates Magnified Two Times

between the quality of the two lots. The zincs in one lot, after comparatively short service, became coated with copper which protected the zinc from the action of the electrolyte, and in consequence the cell became "dead" when but little of the zinc had been dissolved.

It was decided finally that the difference in the zincs was probably physical. Transverse sections were polished and etched lightly with a solution of ammonium sulfide, acidified with hydrochloric acid. The sections are shown in Figs. 1 and 2.

Fig. 1 represents the good zincs and Fig. 2 the defective shipment, at a magnification of two diameters in each case. The samples represented by Fig. 1 were fine grained and of uniform structure, near to the outside surface of the zincs, whereas those of Fig. 2 were coarse grained, indicating pouring into molds at a high temperature. Also, a distinct band of bright metal was seen around the contour of Fig. 2.

The natural inference was that the outside metal contained little mercury, and in order to determine this we took borings from each section around the surface to a depth of 1/16 in., and found the mercury content for Fig. 1, representing shipment A, to be 2.49 per cent, corresponding with the analysis, while that for Fig. 2, representing shipment B, was 1.64 per cent against 2.26 per cent by analysis of shipment samples. These results showed the condition clearly and indicated the main cause of failure of shipment B.

It is necessary not only to avoid overheating the bath of metal, but also to keep the molds cooled. Evidently in the case of shipment B this latter practice had not been followed, and hence the proportion of mercury upon the surface of the zincs was extremely low and evidently insufficient to protect the zincs from local action.

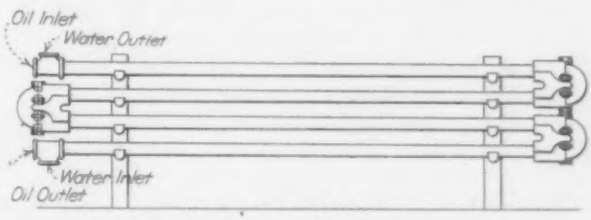
The foundry practice necessary to produce well-mixed, sound, and serviceable battery zincs is not difficult, but it is particularly essential that overheating of the metal be avoided, either in the melting pot or in the mold, and that after addition of the mercury the bath be kept carefully stirred in order to avoid segregation.

*From a paper by Robert Job, vice-president Milton Jersey Company, Ltd., Montreal, and F. F. White, read before the American Society for Testing Materials, Atlantic City, N. J., June 22.

Counter-Current Lubricating Oil Cooler

For cooling the lubricating oil used in steam turbine engines the Sims Company, Erie, Pa., has recently brought out a two-pipe counter-current oil cooler. One of the products of this company is a two-pipe system designed for heating water with steam, for transferring heat from one body of hot water to a body of cold water and for condensing vapors. The heating system consists of a series of pipes and inner tubes, the steam or hot water passing through the outer pipe in an opposite direction to the cold water that absorbs the heat while flowing through the inner tube. The oil cooler is an adaptation of the same type of equipment for cooling instead of heating.

The cooler consists of a series of loops of 2-in. steel pipe and seamless steel or brass inner tubes with an outside diameter of 1½ in., cast-iron heads and return bends. The tubes are expanded into the heads at one end and pass through a stuffing box at the other, thus allowing for expansion and contraction without strain. The pipes are screwed into the heads and can easily be taken off for cleaning and repairs. The oil enters the inner tube at the top and passing downward through the system either under pressure or by gravity is cooled by the cold water flowing through the pipe in the opposite direction, the cold water supply coming into the lower end of the system from the service pipes. The cooled oil is discharged into a conveniently located storage tank. The required circulation is secured by valve control. The cooler is made in various lengths of loops to meet requirements and can be attached to a wall with hook plates like radi-



A Two-Pipe Cooling Device for Lubricating Oil Operating on the Counter Current Principle

ator coils, thus occupying little space. By grouping different units and connecting them with headers there is practically no limit to the size of the cooler.

The cooler is generally designed for reducing the temperature of oil at 170 to 180 deg. Fahr. to 130 to 140 deg. A cooler of this type has just been installed by the General Electric Company in the plant of the Alabama Fuel & Iron Company, Birmingham, Ala. This cooler is designed to cool 1000 gal. of oil per hr. from an initial temperature of 200 deg. to a final temperature of 160 deg., utilizing 700 gal. of water per hr. at a maximum temperature of 90 deg.

It is announced that the Canada Steel Company, Ltd., Hamilton, Ont., will commence shortly the construction of a new open-hearth furnace.

The Positive Identification of Tool Steels

The positive identification of tool steels of various makes and grades in the storeroom, and later of tools made of any special grade of steel upon which a record of performance is sought, is most desirable. Tool steel makers are not always careful to stamp their products plainly, and the various colored paper labels known to the trade, as a designation of brand and grade, are often lost through wear, leaving many like sections of entirely different grade and make, with no other means of identification than the opinion of the storekeeper or tool maker. This often causes unnecessary waste, either in the material or labor of making a tool, when positive information as to the qualities of the steel used does not exist when the tool is made.

The marking of large quantities of stock or of large numbers of tools made from any special stock is expensive when cut figures or letters are used, owing to the wearing or breakage of the steel stencils and the extra time taken in their use. Sharp stencils must be used and care must be taken in using them that the impression may be legible.

We have received a booklet from R. T. Lewis, manager of the Elmira plant of American Bridge Company, Inc., Elmira, N. Y., showing a scheme for the application of identification marks, which

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A Scheme for Identifying Various Grades and Pieces of Tool Steel

he designed and has used successfully. The marks are applied by the use of three easily made and simple tools, a cold chisel with a cutting edge about 3/16 or ¼ in. long, a center punch and a ring punch making a circle about ⅛ in. in diameter. The various marks are made with the chisel and center punch somewhat after the fashion of a telegraph code, the ring punch always *preceding* the mark so that there may be no change in meaning by reversing the order of the dots and dashes. We reproduce a page from the copy sent us to show the arrangement.

A mark is selected for any brand of steel and applied at the extreme ends of the bars in the stock room and to all tools made from this brand, if for any reason this seems desirable, a record being made on the form in the space provided at the right of the mark. If care is used by the tool makers in cutting stock, to always use material from the unmarked end of the stock bars, there need never be any pieces of steel of unknown make or grade lying about to accumulate and possibly be used on a guess at some future time for some purpose to which they were entirely unsuited.

This device of keeping track of the various grades of high-speed steel is especially valuable now when such scrap is increasing in demand owing to the advancing scarcity of tungsten.

The Calhoon iron mine, near Baraboo, Wis., which recently started active operations, is now shipping between 350 and 400 tons daily to the Northwestern Iron Company's furnaces at Mayville, Wis.

Munitions Contracts Pending in Seattle

Recent inquiries in Seattle by an agent of the British Government as to whether Seattle iron plants are equipped to manufacture ammunition, brings to light the fact that a contract for shrapnel and other munitions of war, valued at $1,250,000 will be placed with iron and steel manufacturing plants in the Northwest within the next two weeks. The finished shrapnel, material for the construction of which will be furnished by the agents letting the contract, are to be turned over to the British Government at Victoria, B. C., for shipment to Vladivostock. It is stated the work will be completed within five months time.

The plants equipped to handle an order of this kind are located in Seattle, Everett, Tacoma, and Spokane. A conservative estimate places the number of lathes available for making shrapnel at 100, as follows: Seattle Construction & Dry Dock Company, Seattle; Puget Sound Iron & Steel Works, Tacoma; Vulcan Mfg. Company, Seattle; Sumner Iron Works, Everett, and about a dozen other smaller plants.

A report emanating from an authoritative source states that a contract for the manufacture of 1,750,000 rifles and bayonets has been tendered a prominent Seattle iron-working company by representatives of the British Government. The contract involves, for the rifles alone, the sum of $45,500,000. The rifles are understood to be for the Russian Government for shipment through Vladivostock, and it is also stated that the first consignment, if the contract is accepted, will go forward about Sept. 15. The acceptance of this contract depends entirely on whether a deal now pending for the purchase of iron manufacturing plants in Tacoma, Seattle and Everett, is culminated. In case the deal is completed, the contract will be handled exclusively by the buyers, who are reported to represent a Canadian Syndicate, organized to manufacture munitions of war in the United States. It is declared to have an available cash capital of $40,000,000 to $60,000,000.

The efforts to obtain a bid on the rifles and the tender of shrapnel contracts are believed to be forerunners of the coming of D. A. Thomas, the business agent of the British Government, who is expected on the Pacific Coast within a few weeks.

The principal objection to the use of Seattle plants for the manufacture of shrapnel is the fact that a sufficient number of turret lathes for immediate filling of the order are not available, and owing to the rush of orders for the same material in the East, this equipment is not obtainable. The manufacture of rifles, however, would require easily obtainable equipment, and local iron manufacturers state a rifle factory could be put in working order within a few weeks.

A playground for children living near its factory has been provided by the Athol Machine Company, Athol, Mass. The rules which have been posted bear reprinting: "Do unto the other boy or girl as you would wish the other boy or girl to do unto you. Play fair with each other and enjoy every minute. Give the little fellows an equal chance. A big bully is not liked by any one. You show us you enjoy these grounds and that they are for your good, and we will make them better next year. Play clean here and go home happy. Do a good turn to a playmate every day and you will be the happier for it. Clean play, clean talk, clean thoughts, make clean minds and clean hearts."

Arrangements are reported concluded for the installation of a plant in Australia to treat local molybdenum ores which for many years have been sent to Europe. The ores occur both in South Australia and Queensland and contain bismuth, tungsten and molybdenum. The new plant is expected to render it possible to work up some of the poorer materials hitherto rejected.

Exports of tin from the Federated Malay States for May, 1915, amounted to 3823 tons as compared with 3619 tons in April, making the total for the five months to June 1, 1915, 19,270 tons compared with 20,599 tons to June 1, 1914.

War Order Activity in New England

Construction of Substantial Factories at Speed Which Establishes Records—Employees Increased by Thousands — The Strikes at Bridgeport

Great things are being done in the metal-working dustries of New England, particularly in Connecti-. The past few months have seen achievements the construction of factories which are without rallel, while in long-established shops pressure and genuity have been applied until all records have been oken and the directing minds have surprised them-ves. All this has been a matter of comment among ms supplying tools and materials to these busy ops, but even those so engaged cannot have an ade-uate idea of what is going on without visiting one or o cities, say Bridgeport and New Haven. The man-ers of the big operations have not sought publicity; ey have rather avoided it. Many are saying they ve had too much publicity, and this is unquestionably ue, since the daily press has been devoting so much ace to the labor troubles in Bridgeport. Of this bor trouble and the absurdities involved in its in-ption, something will be said later.

EMINGTON ARMS AND AMMUNITION COMPANY PLANT

An enterprise of gigantic proportions is the plant the Remington Arms & Ammunition Company, a w creation from the ground up, covering many acres d to cost from $5,000,000 to $7,000,000. Already out 21 buildings are erected or nearly so, and even e executives do not know when the construction work ill stop; for when the need of another structure is en, work is begun at once. The new plant is ex-usively for the manufacture of rifles on orders re-ived since the outbreak of the European war—a line manufacture formerly confined to Ilion, N. Y. There e fourteen five-story buildings, each 70 x 280 ft. iewed from the avenue in front of the grounds, these uildings appear as wings on either side of a gigantic ain structure, a sort of spinal column, on which the ords "Remington Armory" are chiseled in stone. here are also six one-story drop forge buildings, each 0 ft. in width, and ranging from 250 to 300 ft. in ngth. An administration building is yet to be erected. hen the entire factory is in operation between 16,000 nd 18,000 men will be employed, a large part of whom ill not be specially skilled, inasmuch as a few hours' nstruction will suffice to acquaint a man with his par-icular task.

One is impressed by the substantial and handsome esign of all the buildings. They are of concrete, brick nd steel, and not built to serve merely the present mergency. No expense has been spared. On one side f the site a large lake is being made.

LIKE A BOOM TOWN IN THE MAKING

Strange scenes for settled New England attend his magic rearing of factories on new ground. It is ot alone the magnitude and the number of the build-ngs which stretch away in the distance, or the army f workmen engaged in all manner of toil, even to build-ng tunnels by the cut and cover method, that impresses he onlooker, but the scenes around the guarded en-rances. Scores of pushcarts are laden with refresh-ments of every description. Here and there, near the ompany's property are temporary shacks occupied by ther purveyors of food. On the company's grounds re other eating houses, more pretentious in construc-ion, with balconies on which workmen sit at tables and eat in comfort. The whole picture is a combination of ew mining camp, circus and local fair, the like of which is rarely seen in an industrial community. At the noon hour the workingmen fill the street, crowd around the vendors and throng the eating places. To a comment on the remarkable scene a company official replied promptly, "But it won't be here long." Other and better provision will be made for the permanent workers in the plant.

That the floating population is spending its money freely is shown by the reply of an ironworker to a merchant's suggestion, on seeing his roll of bills, that he had a chance to save money. "Why should I save it?" said the man; "isn't money made to spend?" With all the thousands of men and money which the new plant will bring to Bridgeport the movement is not regarded with complacency by all of the natives. A large part of the new element is declared undesirable.

ADMISSION TO PLANT CLOSELY GUARDED

Guards are thick about the plant. No one can enter without a pass issued after careful scrutiny, and only to those having actual business. The pass entitles the bearer to go to some particular building to see a person named, and must be shown on demand, not only at the outer entrance but again and again as buildings are approached. If not to be used again, it must be surrendered as the visitor leaves the grounds. The workingmen employed by the James Stewart Company, Inc., contractor, New York, which is erecting the buildings, are given a numbered check when they leave at night, and this they must turn in the following morning, receiving another and similar check, but of another color. While not conspicuous, detectives are numerous about the place.

The grounds of the arms plant adjoin the great property of the Remington U. M. C. Company, which is so closely affiliated with the Remington Arms & Ammunition Company as to be practically the same, although the managements are separate. Marcellus Hartley Dodge is the principal owner of both. Many new buildings have been constructed by the ammunition company, some of large size. Here again the casual visitor is impressed by the omnipresent watchmen—lean, athletic young fellows, who try to look unconcerned as they scan the passer-by. Many of them look ready for action.

SUB-CONTRACTS MAKE PLANTS BUSY

Not all the interesting operations are confined to the Remington plants. The company has contracted for the manufacture of rifle parts with twenty or more factories in New England. The leading machine tool manufacturer of Bridgeport is enjoying a prosperity he never knew before, and has sub-let contracts for parts of his machines to several other factories. This situation is true of all the machine tool builders in New England as it is in other territories. The Bridgeport Brass Company, which has lately added to its floor space, is busy night and day in the production of brass products. Brass shells is one of its specialties. There are in New England but few contracts for steel shrapnel cases.

The Bridgeport Projectile Company, Walter A. Knight, president, has completed three buildings containing 175,000 sq. ft. for the manufacture of shrapnel and explosive shells exclusively. It has contracts with three governments. The company has completed its purchases of machinery. To equip this plant and the enormous Remington plants, carloads of machine tools are arriving daily. The Lake Torpedo Boat Company is working under pressure. A new industry in Bridgeport is the Max Ams Machine Company, manufacturer of stamping presses and can machinery. It is located in the Fairfield district in a new plant, having removed from Mount Vernon, N. Y. It is not making any war materials and will expand in the manufacture of presses. The plant of the Locomobile Company of America is working night and day on trucks for England and touring cars for Russia.

It is estimated by Frederick Enos, secretary of the Bridgeport Board of Trade, who has named his city the industrial capital of Connecticut, that the population of Bridgeport will increase 30,000 to 40,000 in the next few months. He says that a good class of dwellings will be erected for the workers, and that there has been effective opposition to anything of a temporary character in the building line.

NEW CONSTRUCTION RECORD AT NEW HAVEN

At the works of the Winchester Repeating Arms Company, New Haven, Conn., already covering many acres, wonders have been done in new plant construction, but as the buildings are additions to an existing plant they are not so spectacular as in the case of the Remington works. In the construction of a splendid building of reinforced concrete, 58 x 646 ft., and four to six stories, only ninety days were required from excavation to roof. It is believed to be a new record. The factory facilities of both the gun and cartridge departments have been greatly increased. The building referred to will be used partly for offices and partly for the gun department. There has been built also a new drop forge shop, a large building for the manufacture of ordnance cases, a testing building and rifle range, 680 ft. long, and from two to four stories high, and some smaller buildings. Several large buildings are now being constructed for the cartridge department. The Winchester operating force has increased from 6000 to 12,000 men in the last few months, and it is estimated that at least 15,000 will be employed when the construction work is finished. About 2000 men are employed by the building contractor, the Aberthaw Construction Company, Boston. At this plant, also, the atmosphere teems with activity and guards are stationed at all strategical points.

The Naugatuck valley, the center of the brass working industry, is busier than ever before in its history, and Waterbury brass and copper mills are giving special machine work to their machine shop neighbors, making the latter busy on dies, jigs, tools and special machines. Many machine tool builders throughout the country have stopped making tools for their machines and are concentrating on the machines themselves. Throughout New England are small companies which make hand milling machines and small grinding machines, and all are turning out their maximum output. There is a good demand for stampings and screw machine products, especially those of the larger sizes, many makers having loaded up with orders on war account.

With regard to the larger plants it is a question where the necessary labor can be secured. The answer, according to one official, is, "All over the United States." Agents of some of the larger companies are scouring New England and have found a productive field in some of the cities where large hardware factories are located. The hardware trade has been dull for months, but a leading manufacturer of New Haven says that business is picking up. His plant is operating at 60 to 70 per cent of capacity, and so far he has had no difficulty in getting or retaining the help he needs, a fact he ascribes to New Haven's advantageous situation with regard to labor supply.

UNREASONABLENESS OF LABOR

The daily newspapers have contained much about the labor trouble in Bridgeport, and with the large proportion of error often incident to the hasty gathering of news. In the case of the Remington Arms & Ammunition Company's plant, the James Stewart Company, Inc., New York, which has the contract for the erection of the buildings and the installation of all shafting and hangers, has no other affiliation with the Remington Company, and is a closed shop institution. Carpenters, ironworkers, millwrights and machinists are involved in the dispute, and only the last-named are employees of the Remington company. When the millwrights began placing the hangers and shafting, the Union machinists claimed that the millwrights should join them. The ironworkers' and carpenters' unions also laid claim to them. The ironworkers were willing to cede their claim to the machinists, but the carpenters would not consent to this, and eventually the millwrights did join the carpenters' union. About 250 ironworkers then went on strike, and on July 14 the millwrights were called out by the ironworkers and obeyed. Agitators on the ground claimed that the Remington company had persuaded the millwrights to join the carpenters' union, but this the company denies. Its position was that the men were engaged under union rules, paid union wages and given continuous work, and that the trouble was brought about entirely by a family quarrel among the men. If the various unions could reach an agreement among themselves, the company maintained, the trouble would be over in five minutes. A carpenter who discussed the subject said he knew of no complaint that could be found with the treatment of the men on the Remington job. He himself commuted from New Haven every day, although he could get work in his own city because he liked the conditions at Bridgeport better. The situation was rendered more complicated as the plants outside of the Remington company became involved when the machinists announced after a meeting on the night of July 16, that they intended to demand an eight-hour day in all of the machine shops in Bridgeport.

REMINGTON INTERESTS GRANT EIGHT-HOUR DAY

President Dodge of the Remington Arms & Ammunition Company evidently had anticipated this move, for on July 14 the following statement was issued:

Beginning August 1, all the workshops of the Remington Arms & Ammunition Company and the Union Metallic Cartridge Company of Bridgeport, and Ilion, N. Y., will be operated on the eight-hour plan. Without reduction of pay workmen of all grades will be required to work but 8 hours a day, instead of 10, as heretofore.

Economic conditions governing the labor situation throughout the United States have shown a general tendency toward an eight-hour day, and the shortening of labor hours was adopted by the government several years ago. It was found upon actual test in both arsenals and navy yards that the cost of production of arms and of battleships was but slightly if at all increased by the change. The reason why the production of a man working eight hours so nearly equals that of one working two hours longer during the same day is easily accounted for in increased efficiency, and the Remington Companies in following the lead set by the government are influenced by the same considerations. They particularly desire the best class of men obtainable and the maximum efficiency of each. To that end and with the view of granting the fullest measure of contentment and reward faithful service in a substantial way, the decision to reduce the working hours of their employees was arrived at.

In pursuance of this determination, the following order was to-day, July 14, issued by Mr. Marcellus Hartley Dodge, president of the Remington Arms & Ammunition Company and of the Union Metallic Cartridge Company:

"The management has had under consideration for the past few months some plan whereby the employees of the Remington Arms & Ammunition Company and the Union Metallic Cartridge Company might receive tangible recognition of the value of their services, and have decided that would best be shown by reducing the number of hours constituting a day's work.

"The employees of the above works will therefore be notified that beginning Aug. 1, 1915, and until further notice the regular working day will be eight hours instead of ten hours as heretofore, and the wages of day work and piece work employees will be adjusted to yield substantially the same weekly earnings as at present."

In the first few days of the trouble about 400 men were out, and so far as outward appearances went there was little interruption to operations. Fortunately, the building work was well advanced. Some manufacturers in Bridgeport regret the action of the Remington Arms & Ammunition Company in reducing hours at this time. It is reported that three concerns in Bridgeport will follow the action of the Remington company.

On the night of July 19 the labor leaders gathered in Bridgeport announced that an extension of the strike would become effective at noon the following day. It was designed to tie-up not only the manufacture of war munitions at the Remington plants but also the score of plants having sub-contracts from that company. The Manufacturers Association of

Bridgeport held a meeting July 19, and later issued this statement:

As a result of a meeting of the Manufacturers Association this morning it was decided that the manufacturers of Bridgeport would stand as a body behind the Remington Arms Company in its decision to operate only an open shop, inasmuch as under this plan industrial conditions here have been satisfactory to employer and employee for many years.

Up to the date mentioned it had been believed that high union officials would see the justice of ordering the men on strike back to work, although the union leaders in Bridgeport had done much talking indicating that their aim was to get all the shops in Bridgeport on an eight-hour day and, incidentally, unionize the city. About six weeks ago there was a strike of bricklayers on the Remington plant, but the union officials voluntarily ordered the men back after an investigation. That strike was the product of agitation.

As first formulated, the plans of the labor leaders called for 500 men to go out at the word. This number, added to those already out, would make about 1000 men on strike, but the officers of the Remington Company denied on Tuesday that their machinists had gone out. The labor leaders have indulged in much loose talk. They have said that they would not only plunge the entire city of Bridgeport into a strike, but would cause the trouble to spread to other cities. Officials of the American Federation of Labor at Washington are quoted in a dispatch as saying that they were confident of an adjustment of the Bridgeport trouble. The jurisdictional dispute between the carpenters, machinists and ironworkers was conceded to be but a nominal cause of the strike.

The blow which was to be struck by the unions, scheduled to fall at noon Tuesday, proved to be a fiasco so far as the Remington Arms & Ammunition Company is concerned, largely through the device which Major Walter G. Penfield, U. S. A., retired, employed to give him an opportunity to appeal to the intelligence of the men to be called out. When the noon hour arrived the machinists were supplied with their luncheon within the plant and it was suggested that they hold a meeting and discuss the matter for themselves. They were reassured that they would get an eight-hour day as previously promised and receive pay for ten hours' work. They decided to remain at work and voted thanks to Major Penfield.

The labor leaders were disappointed at the turn affairs had taken, but insisted that they would yet get the men out, and when the night shift went on pickets succeeded in persuading about seventy-five not to go to work. Non-union men were warned that they would be driven out of town. Probably about 100 machinists quit at three shops which are handling war business—the Gaynor Contracting Company, the Bridgeport Engineering Company and the Columbia Bolt & Nut Company. A group of machinists was discharged by the Bullard Machine Tool Company on Saturday. There is no question but that the entire trouble would be quickly settled were it not for the agitators. The statement persists that unseen influences are working within the ranks of the unions to foment trouble, and a dispatch from Washington says that Samuel Gompers has called a meeting of labor leaders, including those active at Bridgeport, to consider this phase of the question.

The American Car & Foundry Company announces that it will make 2100 of the cars it will build for the Russian Government at its plant at Madison, Ill. The work will not begin until close to Sept. 1 because of the necessity for preparing for construction along the lines of different specifications from those commonly in use. The Madison plant has a capacity of 50 cars daily and can utilize a force of 3000 men. The cars are to be shipped to Seattle, Wash., and thence across the Pacific. The plant is at present operating with only about 600 men.

The U. S. Expansion Bolt Company, 90 West Street, New York City, has opened a branch office at 42 North Seventh Street, Philadelphia.

"Shippers' Load and Count" in Bills of Lading Upheld

WASHINGTON, D. C., July 20, 1915.—The Interstate Commerce Commission has rendered a decision of great importance to the iron and steel trades because of the general use therein of plant railroads, loading sidings, etc. The commission sustains recently promulgated tariffs of carriers in the principal classification territories, denying to shippers whose goods are loaded on private tracks without the inspection of railroad representatives the unqualified receipts embraced in the standard bill of lading and requiring them to accept a bill indorsed with the statement that the goods are receipted for "shipper's load and count." An interesting feature in the controversy is the fact that the recently enacted Cummins amendment regarding carriers' liability is considered by the commission to have strengthened the carriers' position in contending for the legality and reasonableness of the tariff provision in question. The defendant carriers set forth that at all important shipping points they have provided public facilities, consisting of freight depots and team tracks, at which they maintain the necessary force of employees to check shipments as loaded, issue for the freight there received and checked, bills of lading without notation thereon of the statement "shipper's load and count" and assume lawful responsibility therefor. They claimed they were within their lawful rights in attaching reasonable conditions or qualifications to receipts issued for shipments which are loaded by a shipper at the industry.

The Cummins amendment was added by Congress as a modification of the Carmack amendment, but the commission holds that it cannot be invoked to meet the contentions of the defendant carriers in this controversy. On this point the commission says:

> Since this case was submitted there has been enacted the so-called Cummins amendment to the provision of Section 20 of the act hereinbefore quoted, which has the effect of invalidating all limitations of carriers' liability for loss, damage or injury to property transported caused by the initial carrier or by another carrier to which it may be delivered or which may participate in the transportation. We do not think, however, that the "shipper's load and count" provision here in question is such a limitation upon carriers' liability as is contemplated by the prohibition of this amendment. It does not appear that this rule operates to limit the liability of the carrier for the full value of the property shipped, but in its application to a claim for loss because of alleged failure to deliver the whole amount transported has the effect of placing the burden upon the shipper who loads on his private sidetrack to prove that the amount specified was loaded and that a less amount was taken out of the car by the consignee; whereas in the case of a receipt not so qualified the burden is upon the carrier to prove that the amount specified in the bill of lading was either not in fact loaded, or was delivered, or otherwise to settle for the full value thereof.

The commission adds that it should be borne in mind that a shipper is not denied his right to an unqualified receipt in any case in which delivery is tendered to the carrier at any of its public stations where it provides facilities for the receipt and delivery of freight.

W. L. C.

Canada to Manufacture Complete Shells

A. W. Wheatley, general manager of the Canadian Locomotive Company, Kingston, Ont., has announced with regard to complete shells being made in Canada instead of only empty shells, that the Canadian Government is being urged to equip a plant for the placing of fuses and explosives in the shells, so that the plants now manufacturing empty shells would not be under the necessity of further outlay. It is expected, if this plan is not carried out, that the manufacturers themselves may co-operate in securing such an assembling plant. Full information with regard to the shell-making capacity of Canadian industries will be placed before the British Government representative, David A. Thomas, who is expected to reach Ottawa, Ont., shortly. With this object in view a number of leading manufacturers have held a meeting in conference with members of the shell committee. General Bertram, president of the shell committee, assured the meeting that the war office was prepared to place further and larger orders with the shell committee as soon as it was shown that the work could be done.

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THE IRON AGE

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War Contracts Demand Caution

That contracts for supplying shrapnel and high explosive shells should be undertaken with a full degree of caution is becoming more and more apparent. There is danger that some manufacturers, in their zeal to become busy and to make profits compensating for the long period of dullness, will assume obligations difficult of fulfilment, perhaps impossible. The necessary machine tools are not to be acquired easily within a period of several months, or at normal cost; but there is much more to be considered. Used machinery must be in very good condition to be used in shell work. The supply of labor of the kind required is none too plentiful, and there is evidence that due consideration has not been given to this phase of the matter.

As demonstrated at Bridgeport, Conn., labor is likely to become unreasonable, not only in cases where the union demands are met, but where even more is granted. All the talk of war business, a good part of which has been rightly called "phantom orders," is in millions, and much that has been published of contracts running into fabulous sums has helped to foster the idea in the heads of workingmen that fortunes are quickly made out of war supplies. A great deal of money will be made, but there is another side to the story.

The labor situation is reaching a point where a mechanic can discriminate as to the kind of machine he cares to operate. It is now necessary for the larger companies, which plan to increase their working forces by thousands, to send out emissaries seeking men, just as manufacturers send out salesmen to sell their goods. An old student of economics engaged in the metal-working line takes the view that when manufacturers could sit in their offices and wait for customers to come to them, as they did years ago, they could follow a course of independence. To-day they must diligently seek the buyer and consider his terms as well as their own. The comparison might be carried to the seeking of labor. It is a matter for serious thought on the part of those who would greatly increase their operating forces to handle war contracts. Its solution would seem to go back to getting a price for the product that will enable contractors to face newly created conditions with equanimity.

Caution is also necessary for other reasons. A business man whose contract for shells looked like 100 per cent profit when it was taken now says that so many unexpected hindrances to rapid and efficient production have turned up that he may not make a dollar. In another instance a contractor is not making the production he had guaranteed and he has sub-let a part of his contract carrying a good share of his anticipated profits. Production has been hampered in at least one instance by deliberate soldiering on the part of employees, who have purposely damaged a part of the feed mechanism of their machines, thereby rendering them useless until repaired. It is not alone in shell work that results have been unsatisfactory, though there they predominate. A machine tool manufacturer who sub-let parts of his machine to increase production scrapped the first batch of parts he received in its entirety and canceled the contract. Another firm canceled a contract for shrapnel fuse-timers because its equipment of second-hand machines purchased for the job would not turn out a product in conformity with the required limit of plus or minus 0.0005 in.

There is no reason why, with proper equipment and the exercise of intelligence and mechanical skill, Americans should not get their full share of legitimate war business, but there must not be too many repetitions of the incidents to which reference has been made.

New Construction Again in Steel

It is well to set together a few items of news in the iron and steel trade of the past few weeks. The United States Steel Corporation has begun to rush work on the new Duluth steel plant, so as to make the first steel well before the end of the current year, instead of in the early part of next year. A new blast furnace is to be built at Canton, Ohio, with an attendant by-product coking plant. A steel interest at Youngstown, long operated, with other steel plants, at a disheartening percentage of capacity, has suddenly decided to build an additional open-hearth furnace and is rushing work so as to make steel in it within 90 days. These are straws suggesting that the iron and steel industry is starting on a fresh campaign of increasing capacity.

This is the old story. Each period of prosperity finds the capacity inadequate. Even the expansion of demand in 1912, although it was by no means altogether healthy or promising of per-

nence, did for a while put the steel works under ssure. The steel mills could have found con- nees for considerably more steel than they were e to ship in the early months of 1913.

That there will be any very large amount of construction in the next year or two in iron steel is, however, very doubtful. No one de- es to build new plants at a high first cost, and conditions that would call for additional iron steel making capacity would in all probability the same time make labor so scarce as to put a mium upon the cost of new construction. The rticular effort of the industry will undoubtedly to squeeze out the last ton possible with the ipment and men available.

ur Steel Exports to Neutrals

The trade is quite familiar with the fact that exports of steel to the belligerents have been adily increasing, and predictions are made that trade will continue to increase, but probably y up to a certain point, to a level that may per- ps be fairly constant until toward the close of war.

In our exports to neutral countries there prom- s to be a large increase, and this fact is per- ps not fully realized. Upon the outbreak of the r, now nearly a year ago, there was much idle k as to the trade of neutral countries falling into r lap, because the other steel producing coun- es would be shut out. The trade did not ma- rialize, but the fact that it did not materialize the early months of the war does not prove that re will be none. Business in the neutral coun- ies, particularly in South America, was prac- ally paralyzed, but there was no reason to as- me that it would remain paralyzed. Only a rtial recovery would mean an increase in trade hich would be very important to the American el trade. The allotment of prosperity to the nited States through the war has been so great at one cannot doubt other countries are profiting so to an extent.

The fact to be emphasized is that the steel de- and from neutral countries, even though greatly duced from its former average, would constitute large tonnage from the viewpoint of the Amer- an steel trade, accustomed as it has been to but very small fraction of the total world demand.

It is impossible to make general figures precise, t a fair picture of conditions before the war is at the non-producing countries imported of steel oducts, not including cast material, a matter of out 10,000,000 tons a year, certainly not much s than that amount, taking the average of five ars before the war. The average in the five years ding 1899, years of depression, relatively, roughout the world, was about 4,000,000 tons, or rhaps a shade less. The totals of the various ex- rt statistics, of course, run much larger, because e iron-making countries export partly finished oducts to each other.

One cannot estimate how greatly the 10,000,000- n demand of neutral countries will eventually find self diminished by present conditions, but it is rtainly an error to take the demand of the first welve months of the war as a criterion, as buyers allow their stocks to run down and are slow to purchase material from new sources. Indeed, they will hardly buy until forced to do so.

Taking cognizance of the increase in our exports known to have occurred since April, the last month for which there are detailed tonnage figures, it is probably fair to estimate that our exports of steel products, excluding pig iron, scrap and cast products, and of course not counting the manufactures that are not returned by weight, are now running at the rate of about 3,000,000 tons a year. Of this about 1,800,000 tons is going to the belligerents, in the form of munitions of war and in the form of peace material in which the belligerents cannot fully satisfy their requirements themselves, and about 1,200,000 tons a year to neutral and non-producing countries.

Great Britain's total exports of iron and steel have been showing slight increases, but there is reason to believe that the exports to England's allies have accounted for the total increase, and still more, so that Great Britain's exports of steel products to neutral countries have scarcely increased. They may be estimated as averaging about 1,500,000 tons a year, on the basis of the past three months. There are no other exports to speak of to neutral countries, so that their imports of late appear to have been at the rate of about 1,200,000 tons a year from the United States and 1,500,000 tons from the United Kingdom, a total of 2,700,000 tons a year, or barely more than one-fourth as much as they were purchasing before the war. Certainly there is good reason to expect that the requirements will very materially increase in the next year or two. There is also reason to believe that Great Britain's ability to execute orders from neutral countries will be reduced, because of the pressure necessary to produce war material. The increased trade that may easily come to the United States from neutral countries may therefore be considered in terms of millions of tons a year rather than hundreds of thousands. The trade of the past few months has been only about two-thirds the trade in the years 1895 to 1899. The neutral countries were laboring under financial stress then as they are now, and they have grown greatly in consuming power since then, as well as in power to export merchandise which finds a market even in these war times.

H. H. Campbell's admirable summation of the situation as to raw materials, assembling costs, transportation and markets in the iron and steel producing countries of the world will be recalled by readers of his "Manufacture and Properties of Iron and Steel" as one of the most valuable features of that work. To such it is not necessary to give any reminder of Mr. Campbell's eminent fitness to discuss the bearing of the great war on the future of the Minette iron ore district and the possibilities of economic changes based on a new alignment of German or French Lorraine, as he does elsewhere in this issue. It is gratifying to his friends in the steel trade that after some years of enforced abstention from active work in the industry and from authorship, Mr. Campbell is now able to give them the benefit of his valued comment in this forward-looking way.

CORRESPONDENCE

Work's Apprentice School Discontinued

To the Editor: Permit me to ask some questions relative to an article in THE IRON AGE of June 17, 1915, entitled "Work's Apprentice School Discontinued." Are we to understand from the first few lines of this article that scientific management has replaced individual intelligence? Also, is it intended to imply that the education of twenty-eight employees has resulted in supplying future needs for an indefinite period?

I infer that the "widening circle of satisfied workers" is expanding, not because of any improvement of the employees brought about through the school, but through increased pay.

It is difficult to conclude from this article under just what conditions the apprentices were working, but it would appear that they had 4 hr. a week schooling and 48 hr. a week in the shop. It further appears that the full 52 hr. a week were charged against the school. I may be wrong in my interpretation of the results, but it seems to me that if during 52 hr. a week the apprentice was so occupied with learning that he accomplished nothing of value for the company then he should have covered a much larger field in education than is outlined. On the other hand, if this very limited course is all that he covered then most of his time must have been devoted to productive work and was therefore not chargeable to the school.

J. B. SMITH,
Leeds & Northrup Company.

Philadelphia.

Though the article referred to was based on interviews with George D. Babcock, production manager of the H. H. Franklin Mfg. Company, there was the possibility that THE IRON AGE had not correctly interpreted all the conditions surrounding the discontinuance of the apprenticeship school, and accordingly the foregoing letter was sent to Mr. Babcock, who has courteously replied as follows:

To the Editor: Our answer to the question, "Does scientific management replace individual intelligence?" is that it does not, but assists so materially in the development of individual intelligence that it eliminates the great need of a long period of training to prepare men for the particular task that they are called upon to do.

To the second question: "Is it intended to imply that the education of twenty-eight employees has resulted in supplying future needs for an indefinite period?" our answer is that obviously this is not true, but we employ less men to maintain our force than, I presume, many manufacturers in this country even appreciate, and less than is usually considered necessary. Furthermore, there are a great many men eminently suited for mechanical work who have had a good deal of training in other lines of work for which they are not suited. A relatively small expenditure to train these men makes them more useful for us than so-called apprentices who cost us the figure mentioned in the article and then for whom we must allow four to six years for a maturity which places them equally with the class of men above mentioned.

THE MATTER OF CORPORATION SCHOOLS

We are very firm believers in industrial educational work, and the writer is a member of the committee on industrial education of the manufacturers of Syracuse. Most of the local manufacturers understand the problem and the sequel we have had, and I am satisfied they are in very perfect accord with us on our act.

The chief fault of corporation education is the enormous wastage from the classes of students who do not eventually desire and who are not suited or qualified to stay in the mechanical pursuits. The vocational school on the other hand is an excellent institution which to try out men and learn before they are pla where they are suited to go—this, of course, after c sultation with the employers. The biggest crime is t waste from corporation schools through lack of aid direction as to a future line of conduct. With time wasted men do not have the courage to take a cha of wasting the same amount of time trying some ot class of work for which they are as little suited.

I am willing to concede that there could be a co munity corporation school where there is a lar variety of industries, but I am sure that many of t corporation schools are putting into the industries st dents who are great misfits.

For the reasons noted we have dropped our sch but are promoting to the limit the vocational or co tinuation school. GEO. D. BABCOCK,

Production Manager, H. H. Franklin Mfg. Co.

Syracuse, N. Y.

Designing High-Pressure Steel Valves

To the Editor: In THE IRON AGE of July 15 the appeared an article on "Designing of High-Pressu Steel Valves," written by E. G. Greenman. The arti states that a majority of valve manufacturers have be utilizing cast-iron patterns in making steel valves order to save making a new pattern. While this ma have been done, yet it appears that as there will be i creased demand for steel valves for superheated stea purposes it surely would pay to make new patter which not only would save weight but would be design specially for superheated steam. The influence of th heat combined with the working pressure makes absolutely necessary that steel valves should be th result of modern methods in valve design and not of im patterns which were designed for different purpos The iron pattern is not only a waste of metal, but al allowances for finish on machined surfaces should b taken into consideration. Moreover, as great care ha not been taken in their design for expansion, the valv is a poor product to install.

The writer does not believe that the metal should b thickened in some parts of the valve to withstand th stress, as this would constitute a casting having thi and thin spots which would set up different interna stresses and besides would increase the danger of rup ture due to spongy material. In addition, the molde does not care to make a casting of this type as the want constant thickness of metal which freezes mo uniformly than a casting having thin walls on the bo tom and thick walls on the top. Castings, like those i question, are always cast from the top and for thi reason the metal on the bottom cools off before th casting may be completed.

In designing valves the formula $\frac{d}{t} = \frac{d'}{t'}$ is theoreti cally correct, but practical considerations force us t consider the section which is subject to the greates stress as a base, putting enough metal to resist al internal and external stresses which would apply to th flat section of the valve body at the throat flange. Th thickness obtained for this part should be applied to al parts of the valve with the exception of the flange which can be made to suit conditions.

It is true that the time is ripe for engineers to appl scientific attention to this field of manufacture, but w should not forget that theory and practice do not g hand in hand under each and every condition.

LEO J. SCHAEDLE, Consulting Engineer.

Pittsburgh, July 16, 1915.

Important improvements are being planned for the Maryland Steel Company, Sparrows Point, Md., most of them in the marine department. A new machine shop for ship construction will be built, and an addition made to the boiler shop. An additional slip for the construction of vessels will be provided. The company now has orders for three vessels for the Munson Line, three for the American-Hawaiian Line, and three for the A. H. Bull Steamship Company.

THE MANGANESE SITUATION

1914 Production and Imports of Ore and Ferromanganese

The production of manganese ore in the United tes in 1914 was 2635 gross tons, as compared with tons in 1913, a decrease of 1413 tons, according D. F. Hewett of the United States Geological Sur- Most of this came from mines in Virginia, South olina and California. The imports of manganese in 1914 were 283,294 gross tons as against 354,090 in 1913, a decrease of 70,796 tons or 20 per cent. orts from Russia in 1913 were 124,337 tons, but 52,681 tons in 1914, while from India the 1914 ipts were 103,583 tons compared with 141,587 tons 913. These decreases were partly compensated for increased shipments from Brazil, which were 113,- tons against 70,200 tons in 1913.

The output of all grades of manganiferous ores in United States in 1914 was 445,827 gross tons, nly from the Lake Superior region; of this, 60,414 contained more than 15 per cent manganese and used to produce low-grade ferromanganese and nganiferous pig iron.

The domestic production of ferromanganese in 1914 100,731 gross tons, or 18,764 tons less than in 1913, le the imports were 82,997 tons as compared with ,070 tons in 1913. The domestic production of egeleisen decreased from 106,980 tons in 1913 to 76,- tons in 1914; the imports increased from 77 tons 913 to 2870 tons in 1914. Mr. Hewett states that he domestic production of steel and steel products reases considerably, on account of the temporary mination of competition from European steel prod- s, the sources of manganese supply may be abnor- lly taxed to meet the demand. The increased price, wever, will stimulate domestic production and permit mining of manganese ores which, under normal ditions, could not profitably be worked in competi- n with the higher grade foreign ores.

Conditions in Great Britain

The manganese situation in England, which of rse vitally affects this country, is given in a recent ue of the *London Iron and Coal Trades Review*. e following table is offered showing the imports of nganese ore and exports of ferromanganese for the st half of 1913, 1914 and 1915 as well as for April, y and June of this year.

	Imports of Manganese Ore, Gross Tons	Exports of Ferromanganese Gross Tons
1913, six months to July 1....	350,000	98,500
1914, six months to July 1....	244,000	56,250
1915, six months to July 1....	134,000	40,400
April, 1915	15,400	5,460
May, 1915	5,300	14,100
June, 1915	27,200	12,100

Commenting on these figures editorially the London per says:

While imports of manganese ore in the first half of 1915 w a drop of 110,000 tons, our exports of ferromanganese y show a drop of 16,000 tons. It is clear, therefore, that eiters have done their best to meet the demands made n them by American consumers. In May and June, while orts of manganese ore were only 32,000 tons, the exports ferromanganese were 28,000 tons which on balance con- erably reduces stocks in this country.

According to official data the imports of manga- se ore in Great Britain in 1914 were 479,435 gross ns, compared with 601,177 tons in 1913. While im- orts from Russia and India have decreased, those from razil advanced from 18,792 tons in 1913 to 46,494 tons 1914. From other countries apart from the regular urces, imports increased from 3072 tons in 1913 to 38 tons in 1914, showing that Great Britain is obtain- g as much as possible from other than regular sources.

St. Louis interests, represented by Horace W. ughan of Texarkana, Ark., are reported to be nego- ating for the State blast furnace and pipe works at usk, Tex.

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Germany's Pig-Iron Output in May

Germany's production of pig iron in May, as given in *Stahl und Eisen*, was 985,968 metric tons, the largest since the war began. This compares with 938,679 tons in April this year and with 1,607,211 tons in May, 1914. The output to June 1, 1915, was 4,540,841 tons, compared with 7,756,901 tons to June 1, 1914, a decrease of 41.5 per cent.

The rebuilding of that part of the Cambridge (Ohio) Works of the Interstate Iron & Steel Company which was damaged by the fire of last week is to proceed as rapidly as possible and the interruption of the company's business will be reduced to a minimum. The loss was fully covered by insurance.

Grier Hersh and V. K. Keesey, receivers of the York Bridge Company, York, Pa., have been ordered by the Court of Common Pleas to sell the property of the company to W. W. Fisher, T. Harvey Doan, S. A. Peck and George A. Botdorf, a committee of stockholders and creditors, for $30,050.

The Duncannon, Pa., rolling mill of the Lebanon Valley Iron & Steel Company, which has been idle since May, 1914, is about to be put in operation again.

The Iron and Metal Markets

STILL GAINING GROUND

A Further Strengthening in Steel Lines

More Car Orders Pending—Pig-Iron Prices Show More Firmness

The steel trade continues to gain ground, with enough lag at certain points in the industry to keep the advance from proceeding too rapidly. The feeling crops out here and there that prices on export business apart from war requirements may be put up too fast.

Thus far, while domestic demand has continued at the high rate of June, there has been little indication that consumers are buying to forestall price advances. The disposition still appears to digest first those already made.

It is estimated that more than 400,000 tons of steel for munitions, chiefly bars, is under negotiation, the placing of much of it depending on deliveries. From 2 to 3 cents is asked for shrapnel bars, makers having realized that much of the early war business went at prices much too low. Pittsburgh's latest inquiry is for 29,000 tons of shrapnel rounds for an electrical company.

Russia's further rail requirements are variously estimated. In addition to 60,000 tons placed with the Lackawanna Steel Company and 100,000 tons with the Cambria Steel Company, options have been taken in this country on round lots. West Australia has been asking for 10,000 tons of rails and an independent steel company is credited with getting the business. As open-hearth steel is being taken up for other purposes, rail makers are feeling less and less the absence of railroad buying. In New York City the Public Service Commission has bought from the Bethlehem Steel Company 35,500 tons of main rails and 2400 tons of guard rails.

The Steel Corporation's operations are now at about 91 per cent of its ingot capacity, while the Carnegie Steel Company is employing close to 95 per cent of such capacity. At Chicago the larger operation of the principal plants has been due to the transfer of orders that would naturally be rolled at Pittsburgh.

The tightening of open-hearth steel is seen in an advance in billets and sheet bars at Pittsburgh to $22 and $23 respectively, with Youngstown prices $1 less. London cables that American steel companies are much less disposed to accept British orders for semi-finished steel.

The structural situation in the East is rather better. Besides 35,000 tons for subways in immediate prospect, including 11,000 tons on which bids were taken this week, 35,000 tons of general work is represented in active projects.

Bar iron is higher in the East, the advance ranging from $1 to $2 a ton. Bolts, nuts, and rivets are firmer in Eastern markets, though at Chicago there was a scramble for recent railroad business in steel bolts and concessions were general.

An advance of $2 in steel boiler tubes was made on July 16. An Eastern maker of iron boiler tubes has announced a similar advance.

The cotton tie consumption this year is estimated at 60,000 tons, or somewhat less than last year's. This is another product in which the fr... list is overruled by the war, leaving the mark... to the home manufacturer at fair prices. For J... shipment 85c. a bundle has been named.

Foreign inquiry for tin plate has increase... Welsh sheet and tin plate mills are hampered b... the coal strike and some have closed down.

The advance to 1.30c., Pittsburgh, for ba... plates, and shapes is so far effective only in part... Bars are still to be had at 1.25c., and plates ha... sold in Eastern and Western markets on a 1.20c... Pittsburgh, basis. But it is noticed that weake... sellers are advancing their prices, even though no... yet abreast of the leaders.

There are some signs of the long-awaite... stiffening in the pig-iron market. At Clevelan... makers are asking higher prices for foundry iro... as inquiry increases. A Toledo automobile com... pany is in the market for 15,000 tons of foundr... and malleable pig iron, deliveries extending int... next year, and there is a 10,000-ton Westinghouse... inquiry at Pittsburgh. At Cincinnati nearly... 40,000 tons of Southern iron has been taken by... speculative buyers, a portion of which brought $1... Birmingham.

Steel-making iron is stronger, the consumption... of basic iron being the largest in two years. In... Southern Ohio a 30,000-ton sale of basic is re... ported. But active blast furnace capacity is in... creasing at the same time.

The open hearth steel situation is reflected in... the market for heavy melting scrap, where an... active demand has advanced prices 50 cents to 7... cents a ton.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics

At date, one week, one month and one year previous

	July 21, 1915.	July 14, 1915.	June 23, 1915.	July 22, 1914.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia....	$14.25	$14.25	$14.25	$14.75
No. 2, Valley furnace....	12.75	12.75	12.50	13.00
No. 2 Southern, Cin'ti...	12.65	12.65	12.65	13.25
No. 2, Birmingham, Ala.	9.75	9.75	9.75	10.00
No. 2, furnace, Chicago*	13.00	13.00	13.00	13.75
Basic, del'd, eastern Pa..	14.00	14.00	13.75	14.00
Basic, Valley furnace....	13.00	13.00	12.65	13.00
Bessemer, Pittsburgh....	14.95	14.95	14.70	14.90
Malleable Bess., Ch'go*..	13.00	13.00	13.00	14.00
Gray forge, Pittsburgh...	13.45	13.45	13.35	13.65
L. S. charcoal, Chicago..	15.75	15.75	15.75	15.75
Billets, etc. Per Gross Ton:				
Bess. billets, Pittsburgh..	**22.00**	21.00	21.00	19.00
O.-h. billets, Pittsburgh..	22.00	22.00	21.00	19.00
O.-h. sheet bars, P'gh...	**23.00**	22.50	22.00	19.50
Forging billets, P'gh....	**28.00**	27.00	27.00	25.00
O.-h. billets, Phila.....	24.56	24.56	22.02	21.90
Wire rods, Pittsburgh...	25.50	25.50	25.00	24.50
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia.	1.22½	1.22½	1.22½	1.17½
Iron bars, Pittsburgh....	1.25	1.25	1.25	1.25
Iron bars, Chicago.....	1.20	1.20	1.20	1.05
Steel bars, Pittsburgh...	1.25	1.25	1.20	1.15
Steel bars, New York....	1.419	1.419	1.369	1.26
Tank plates, Pittsburgh.	**1.25**	1.20	1.15	1.10
Tank plates, New York..	1.369	1.369	1.319	1.26
Beams, etc., Pittsburgh..	1.25	1.25	1.20	1.15
Beams, etc., New York..	1.419	1.419	1.369	1.26
Skelp, grooved steel, P'gh	1.20	1.20	1.15	1.15
Skelp, sheared steel, P'gh	1.25	1.25	1.20	1.20
Steel hoops, Pittsburgh..	1.30	1.30	1.30	1.20
Sheets, Nails and Wire. Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh.	1.75	1.75	1.75	1.80
Galv. sheets, No. 28, P'gh	4.50	4.50	5.00	2.75
Wire nails, Pittsburgh...	1.60	1.60	1.55	1.55
Cut nails, Pittsburgh....	1.55	1.55	1.55	1.55
Fence wire, base, P'gh...	1.40	1.40	1.35	1.35
Barb wire, galv., P'gh...	2.40	2.50	2.40	1.95

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Metals.	July 21, 1915.	July 14, 1915.	June 23, 1915.	July 22, 1914.
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	22.00	22.00	22.50	13.75
Electrolytic copper, N. Y.	19.00	19.50	20.00	13.50
Spelter, St. Louis	20.00	21.75	17.50	4.85
Spelter, New York	20.25	22.00	18.00	5.00
Lead, St. Louis	5.50	5.50	5.35	3.75
Lead, New York	5.55	5.65	5.75	3.90
Tin, New York	36.62½	38.12½	41.25	31.60
Antimony, Asiatic, N. Y.	35.50	36.00	37.00	5.40
Tin plate, 100-lb. box, P'gh	$3.10	$3.10	$3.10	$3.25
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$1.60	$1.60	$1.60	$1.75
Foundry coke, future	1.75	1.75	1.75	1.85
Foundry coke, prompt	2.00	2.00	2.00	2.25
Foundry coke, future	2.25	2.25	2.25	2.35
Old Material, Per Gross Ton:				
Iron rails, Chicago	12.25	12.25	12.25	12.00
Iron rails, Philadelphia	15.50	15.00	15.00	14.00
Carwheels, Chicago	11.25	11.00	10.50	11.25
Carwheels, Philadelphia	12.50	12.50	11.50	11.00
Heavy steel scrap, P'gh	12.75	11.75	11.75	11.50
Heavy steel scrap, Phila.	12.25	12.00	11.25	10.25
Heavy steel scrap, Ch'go.	10.50	10.25	9.50	9.75
No. 1 cast, Pittsburgh	12.25	12.25	12.25	11.50
No. 1 cast, Philadelphia	12.50	12.25	12.25	12.00
No. 1 cast, Ch'go (net ton)	9.25	9.25	9.00	9.50

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal has no stability, being dependent on vessel charges.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.25c. base net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated Feb. 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gage or weight to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gages under ¼ in. to and including 3-16 in.	.10
Gages under 3-16 in. to and including No. 8	.15
Gages under No. 8 to and including No. 9	.25
Gages under No. 9 to and including No. 10	.30
Gages under No. 10 to and including No. 12	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Wire Products.—Prices to jobbers. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent discount in 10 days, carload lots, annealed, $1.40; galvanized, $2.20. Galvanized barb wire and staples, $2.40; painted, $1.60. Wire nails, $1.60. Galvanized nails, 1 in. and longer, $1.75 advance over base price; shorter than 1 in., $2.25 advance over base price. Woven wire fencing, 69 per cent off list for carloads; 68 off for 1000-rod lots; 67 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.55	$1.60	$1.65	$1.70	$1.80	$1.90	$2.00	$2.10
Galvanized	2.35	2.40	2.45	2.50	2.60	2.70	3.00	3.10

Wire Rods.—Bessemer, open-hearth and chain rods, $25.50.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.25c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs	.10
Angles, 3 in. on one or both legs less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Handrail tees	.75
Cutting to lengths under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card in effect from June 17, 1915, all full weight:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛, ¼ and ⅜	72	40½	⅛ and ¼	64	31
½	76	53½	⅜	64	31
⅝ to 3	79	57½	½	68	41
			¾ to 2½	71	46

Lap Weld

2	76	54½	1¼	55	30
2½ to 6	78	56½	1½	66	41
7 to 12	76	54½	2	67	43
13 and 14	62½	..	2½ to 4	69	46
15	60	..	4½ to 6	69	46
			7 to 12	67	46

Reamed and Drifted

1 to 3, butt	77	55½	1 to 1½, butt	69	44
2, lap	74	52½	2, butt	69	44
2½ to 6, lap	76	54½	1¼, lap	53	28
			1½, lap	64	39
			2, lap	65	41
			2½ to 4, lap	67	44

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	67	43½	⅜	61	37
½	72	52½	½	66	45
¾ to 1½	76	56½	¾ to 1½	70	47
2 to 3	77	57½	2 and 2½	71	48

Lap Weld, extra strong, plain ends

2	73	51½	1½	65	42
2½ to 4	75	53½	2	67	43
4½ to 6	74	52½	2½ to 4	69	46
7 to 8	68	46½	4½ to 6	68	45
9 to 12	63	41½	7 to 8	61	40
			9 to 12	56	35

Butt Weld, double extra strong, plain ends

½	62	42½	½	56	34
¾ to 1½	65	45½	¾ to 1½	59	37
2 to 2½	67	47½	2 and 2½	61	39

Lap Weld, double extra strong, plain ends

2	63	43½	2	57	34
2½ to 4	65	45½	2½ to 4	59	39
4½ to 6	64	44½	4½ to 6	58	38
7 to 8	58	36½	7 to 8	51	29

To the large jobbing trade an additional 5 per cent is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts on less than carloads, f.o.b. Pittsburgh, freight to destination added, in effect from July 16, 1915.

Lap Welded Steel		*Standard Charcoal Iron*	
1¾ and 2 in.	63	1¾ and 2 in.	50
2¼ in.	60	2¼ in.	47
2½ to 2¾ in.	66	2½ and 2¾ in.	54
3 and 3¼ in.	71	3 and 3¼ in.	58
3½ and 4½ in.	72	3½ and 4½ in.	60
5 and 6 in.	65	5 and 6 in.	54
7 to 13 in.	62		

Locomotive and steamship special charcoal grades bring higher prices.

1¾ in., over 18 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gage, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net, or 2 per cent cash discount in 10 days from date of invoice.

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	1.25 to 1.30
Nos. 9 to 10	1.30 to 1.35
Nos. 11 and 12	1.35 to 1.40
Nos. 13 and 14	1.45 to 1.50
Nos. 15 and 16	1.55 to 1.60

Box Annealed Sheets, Cold Rolled

	Cents per lb.
Nos. 10 and 11	1.40 to 1.45
No. 12	1.40 to 1.45
Nos. 13 and 14	1.45 to 1.50
Nos. 15 and 16	1.50 to 1.55
Nos. 17 to 21	1.55 to 1.60
Nos. 22 and 24	1.60 to 1.65
Nos. 25 and 26	1.65 to 1.70
No. 27	1.70 to 1.75
No. 28	1.75 to 1.80
No. 29	1.80 to 1.85
No. 30	1.90 to 1.95

Galvanized Sheets of Black Sheet Gage

	Cents per lb.
Nos. 10 and 11	3.50 to 4.00
No. 12	3.60 to 4.10
Nos. 13 and 14	3.60 to 4.10
Nos. 15 and 16	3.70 to 4.20
Nos. 17 to 21	3.85 to 4.35
Nos. 22 and 24	4.05 to 4.55
Nos. 25 and 26	4.20 to 4.70
No. 27	4.35 to 4.85
No. 28	4.50 to 5.00
No. 29	5.25
No. 30	5.50

Pittsburgh

PITTSBURGH, PA., July 20, 1915.

The steel trade is gaining steadily, both in output and in the maintenance of prices. Prices are higher than for more than a year on nearly all finished and semi-finished material, as well as on pig iron. Bessemer iron is strong at $14, and basic at $13, Valley furnace, and there have been fairly heavy sales. Plates, shapes and bars are stronger at 1.25c., the Carnegie and Jones & Laughlin interests quoting 1.30c. on nearly all new business except in some competitive territories. Prices on lap welded steel and iron boiler tubes were advanced $2 a ton, effective from July 16. Operations are steadily increasing, the Carnegie Steel Company running this week to nearly 95 per cent of ingot capacity. Large inquiries for war materials are coming to Pittsburgh mills, but on some of these they cannot quote, being unable to make the deliveries wanted. The local steel situation looks better to-day than at any time for many months, the Carnegie Steel Company being filled up on practically everything it makes for the next three or four months. It is believed that very shortly the price on plates, shapes and bars will be firmly established at 1.30c., Pittsburgh. This month the Jones & Laughlin Steel Company has blown in one Eliza and one Aliquippa furnace and is now operating Soho, all five Eliza furnaces and three out of four of the Aliquippa furnaces. The National Tube Company has blown in two blast furnaces at Wheeling and will start up its Bessemer steel plant and pipe mills at Wheeling early in August. The Carnegie Steel Company has again been a buyer of open-hearth billets and will probably take on several more lots. There is almost a famine in supply of open-hearth steel, and the mills are back on deliveries. The scrap trade is picking up in demand, prices having improved on some grades 50c. a ton or more. The coke trade is quiet, but several more merchant blast furnaces are expected to start within the next two or three weeks.

Pig Iron.—The largest sale of the week was 16,000 tons of Bessemer pig iron for delivery over the next three or four months to a Youngstown steel company which in turn sold 30,000 tons of ore to the maker of the iron. The transaction figures out at $14, Valley furnace, at current ore prices. There have also been sales of 12,000 to 15,000 tons of standard Bessemer iron in the past week at practically the same price. There have not been any sales of basic, but the market is firm at $13, Valley furnace. The Westinghouse Electric & Mfg. Company has inquiries out for about 10,000 tons of foundry iron for delivery over last four months of the year, but will not likely buy for a week or more. The whole pig iron market is better, prices being slightly higher and very firm. There are only two or three sellers of Bessemer iron, and it is predicted it will advance still more in the near future. An enormous amount of open-hearth steel is being produced, and the present consumption of basic iron is the heaviest in nearly two years. Some active buying of foundry iron for last quarter is expected. As yet nothing has been done with the foreign inquiry for 40,000 tons of Bessemer iron. It is understood this is for Italy, and the specifications are very rigid. Prices as high as $15, Valley furnace, have been named. We quote: Standard Bessemer iron, $14; basic, $13; gray forge, $12.50 to $12.75; No. 2 foundry, $12.75 to $13, and malleable, $13, Valley furnace, the freight for delivery in the Pittsburgh or Cleveland districts being 90c. a ton. A local interest has just sold 5000 tons of standard Bessemer iron through a New York broker for shipment to Italy at $14, Valley furnace. The iron will all be shipped in July and early August. We also note a sale of 600 tons of standard Bessemer iron for equal deliveries over July to December at $14.25, Valley furnace. The extra 25c. a ton was obtained on account of extended deliveries.

Billets and Sheet Bars. — The situation in open-hearth steel has tightened up still more, and a local interest bought last week 5000 tons of 4 x 4-in. open-hearth billets from a Youngstown mill, and will probably make further purchases either in the East or from Valley steel mills in the near future. The Carnegie Steel Company has no Bessemer or open-hearth steel to sell, and is getting further behind in deliveries on contracts of regular customers. The Carnegie Company is operating its open-hearth capacity to 100 per cent and Bessemer to fully 90 per cent. Prices of billets and sheet bars are higher this week, and we note a sale of 1000 tons of sheet bars at $22, Youngstown mill, and another sale of 1500 tons at the same price. We have advanced our figures and now quote: Bessemer and open-hearth billets $21 to $21.50; Bessemer and open-hearth sheet bars, $22, Youngstown mills; Bessemer and open-hearth billets $22 and Bessemer and open-hearth sheet bars, $23, f.o.b. Pittsburgh. Forging billets are also higher and it is stated small sales have been made at $28, maker's mill. Forging billets are $28 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 and up to 0.60 carbon take $1 per ton extra. Axle billets are held at $24.

Ferroalloys.—It is stated that several contracts for English 80 per cent ferromanganese have been made at the regular price of $100, Baltimore, but no assurance has been given as to deliveries. There is more inquiry for ferromanganese for prompt shipment, and the market is firm at $100 to $105, f.o.b. Pittsburgh. We note sales of six to eight cars, or probably 300 tons in all, at close to $105, delivered Pittsburgh. We quote 50 per cent ferrosilicon in lots up to 100 tons, at $73; over 100 tons to 600 tons, $72, and over 600 tons, $71, delivered in the Pittsburgh district. We quote 10 per cent ferrosilicon at $17; 11 per cent, $18; 12 per cent, $19, all f.o.b. cars at furnace Ashland, Ky., Jackson or New Straitsville, Ohio, each of these points having a rate to Pittsburgh of $2 per gross ton. We quote 20 per cent spiegeleisen at $25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads, 10c. in 2000-lb. lots and over, and 12½c. in smaller lots.

Structural Material.—New inquiry is fairly heavy and some large work is in sight. While the structural mills are not particularly busy rolling shapes, they are filled up on other material and the market is very firm. The McClintic-Marshall Company has taken about 3000 tons for new steel buildings for the Youngstown Sheet & Tube Company at Youngstown, Ohio. Bids are in on 5600 tons of steel for city and county buildings in Pittsburgh, and the work is expected to be placed on Wednesday, July 21. We quote beams and channels up to 15-in. at 1.25c. to 1.30c. for delivery over remainder of the year and the mills state that the lower price is absolutely minimum.

Plates.—Local plate mills are filled up over the next two or three months and the situation is strong. The Baltimore & Ohio Railroad has placed 1000 steel hopper cars with the American Car & Foundry Company, 500 with the Cambria Steel Company, the same number with the Pressed Steel Car Company, and about 50 passenger and baggage cars with the Pullman Company. Prices on plates are firmer, the smaller mills being better filled up than for some time and adhering more closely to the prices quoted by the larger mills. We quote ¼-in. and heavier plates at

1.25c. to 1.30c. for delivery over remainder of the year.

Steel Rails.—The new demand for light rails is active, the local interest having received new orders and specifications for over 3000 tons. The demand for standard sections is light and mostly for small lots and prompt delivery. We quote standard section rails of Bessemer stock at 1.25c., and of open-hearth, 1.34c., f.o.b. Pittsburgh. We quote light rails as follows, in carload lots: 8 and 10-lb. sections, 1.275c.; 12 and 14-lb., 1.225c.; 16 and 20-lb., 1.175c.; 25, 30, 35, 40, and 45-lb. sections, 1.125c. The prices of light rails are materially shaded on large lots.

Tin Plate.—The domestic demand is quiet and only for small lots, but foreign inquiry is fairly heavy, especially from India, China, and Japan. A local mill has recently made two large shipments of bright tin plate to India and Japan for which it is stated very close to $3.40 per base box was obtained. The larger tin plate mills are running to about full capacity, the American Sheet & Tin Plate Company operating this week to 94 per cent. On the small domestic orders being placed, we quote 14 x 20 coke plates at $3.10 to $3.20 per base box, but on a very desirable specification the $3.10 price would be shaded for domestic delivery.

Sheets.—Some very large contracts for enameled and special grades of automobile stock have been closed lately, and specifications for these grades of sheets are very heavy. Several mills report that their sales to automobile makers this year are about double those of last year. The new demand for Bessemer black sheets is only fair and for galvanized sheets is very dull, consumers refusing to pay the high prices quoted on the latter. The market on blue annealed sheets is firmer, several mills that have lately been aggressive sellers now being filled up and quoting higher prices. We quote No. 28 Bessemer black sheets at 1.75c. to 1.80c.; No. 28 galvanized, 4.50c. to 5.00c.; Nos. 9 and 10 blue annealed sheets, 1.30c. to 1.35c.; No. 30 black plate, tin-mill sizes, H. R. & A., 1.95c.; No. 28, 1.90c.; Nos. 27, 26, and 25, 1.85c.; Nos. 22 to 24, 1.80c.; Nos. 17 to 21, 1.75c.; Nos. 15 and 16, 1.70c. The above prices are for carload lots, f.o.b. at maker's mill, jobbers charging the usual advances for small lots from store.

Wire Rods.—The export demand for wire rods is heavy, but domestic inquiry is dull as nearly all consumers are covered over remainder of the year. Owing to the higher prices for Bessemer and open-hearth steel, rods have advanced, most sellers now quoting $26 or higher. We quote Bessemer, open-hearth and chain rods at $25.50 to $26, f.o.b. maker's mill, Pittsburgh.

Carwheels.—The two local makers of carwheels have more orders on their books at present than at any time in more than a year. The Carnegie Steel Company has sold up practically the entire output of its Schoen steel carwheel works for the remainder of this year. We quote standard 33-in. freight carwheels, 6¼-in. rough bore, at $16, and standard 36-in. passenger, the same bore, at $22.50 per wheel, f.o.b., Pittsburgh.

Shafting.—Several makers of shafting report they are four to six weeks back in deliveries. New demand is not active, but nearly all consumers are covered by contracts taken some time ago at discounts ranging from 68 to 70 per cent off, and specifications against these contracts are heavy, especially from the automobile builders and implement makers. Prices are firm, and we quote cold-rolled shafting at 66 per cent off in carload lots, and 61 per cent in less than carload lots, f.o.b. Pittsburgh.

Hoops, Bands and Cotton Ties.—Consumption of cotton ties this year will be less than in 1914, and is estimated at about 60,000 tons. There will be no competition to meet this year from foreign mills, and this is reflected in a strong market. New demand for hoops and bands is heavy and specifications are active. We quote cotton ties at 85c. per bundle for July shipment, with ½c. advance for each succeeding month. We quote steel bands at 1.25c. to 1.30c., extras as per the steel bar card, and steel hoops at 1.30c. to 1.35c., f.o.b. Pittsburgh.

Wire Products.—There is a continued heavy demand for barb wire and local mills are turning down inquiries nearly every day on which they are unable to make deliveries. The domestic demand for wire nails and wire is fairly active, but most large buyers are covered by contracts placed some time ago and specifications are fairly heavy. The wire mills in this district are running to full capacity and are now holding wire nails firm at $1.60 to jobbers on new orders, galvanized nails, 1 in., and longer taking an advance over this price of $1.75, and shorter than 1 in., $2.25. Plain annealed wire is $1.40; galvanized barb wire and fence staples, $2.40; painted barb wire, $1.60; all f.o.b. Pittsburgh, with freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Prices on woven wire fencing are 69 per cent off in carload lots, 68 per cent on 1000-rod lots, and 67 per cent on small lots, f.o.b. Pittsburgh.

Skelp.—Steel skelp is very firm and several local makers are asking higher prices. The new demand for both iron and steel skelp is heavier than for a long time and the mills are sold up for some time ahead. We quote grooved steel skelp at 1.20c.; sheared steel skelp, 1.25c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., delivered to consumers' mills in the Pittsburgh district.

Iron and Steel Bars.—Steel bars are more active than any of the other hot rolled products and local mills state that on the smaller sizes of rounds and squares they are back in deliveries six to seven weeks. The enormous demand for large sizes of rounds continues and is not expected to get any less while the war is going on. Consumers that failed to cover for their steel bars when importuned by the mills to do so now find they are unable to get deliveries wanted and in a few cases have offered a premium of $1 a ton for prompt shipments. Local makers of steel bars are now quoting 1.30c. on new orders and it is believed this price will be firmly established, as the minimum of the market in a short time. Specifications from implement makers are active and the Carnegie Steel Company is operating all its bar mills to 100 per cent of capacity. The new demand for iron bars is better and local mills state they have more orders on their books than for a long time. We quote steel bars at 1.25c. to 1.30c. for third quarter; common iron bars, made from part scrap, 1.25c. to 1.30c., and test iron bars at 1.35c. to 1.40c., all f.o.b. Pittsburgh.

Railroad Spikes.—The New York Central has closed for 40,000 to 50,000 kegs of railroad spikes, placing 25,000 to 30,000 kegs for the Eastern lines with two local mills, while the spikes for its Western lines went to a Chicago interest. The Baltimore & Ohio has also closed for 25,000 kegs or more, the business going to local mills. Most of the prominent roads have now covered for their requirements of spikes for the remainder of the year, and the new demand is not very active. The makers report they are pretty well filled up over the next three or four months. We quote standard sizes of railroad spikes at $1.40, and small railroad and boat spikes at $1.50 per 100 lb., f.o.b. Pittsburgh.

Cold-Rolled Strip Steel.—Makers report new demand fairly heavy, but most consumers covered over remainder of the year before the recent advance of 10c. per 100 lb. was made. There is some foreign inquiry for cold-rolled strip steel and some business has been closed. We quote hand-rolled steel, 1½ in. and wider, under 0.20 carbon, sheared or natural mill edge, per 100 lb., $2.85, delivered. Extras, which are standard among all the mills, are as follows:

Thickness, in.	Extras for thickness	Extras for soft or intermediate tempers	Extras for straightening and cutting to lengths not less than 24 in.
0.100 and heavier	Base	$0.25	$0.10
0.099 to 0.050	$0.05	0.25	0.15
0.049 to 0.035	0.20	0.25	0.15
0.034 to 0.031	0.35	0.40	0.25
0.030 to 0.025	0.45	0.40	0.40
0.024 to 0.020	0.55	0.40	0.50
0.019 to 0.017	0.85	0.50	1.10
0.016 to 0.015	1.25	0.50	1.10
0.014 to 0.013	1.95	0.50	1.25
0.012	2.30	0.50	coils only
0.011	2.65	0.50	coils only
0.010	3.00	0.50	coils only

Rivets.—New demand for structural and boiler rivets is much better than for a long time and prices are firm. We quote buttonhead structural rivets at $1.50 to $1.55 and conehead boiler rivets at $1.60 to $1.65 per 100 lb. in carload lots, f.o.b. Pittsburgh, smaller lots bringing 5c. to 10c. advance, depending on the order. It is stated that prices on structural rivets are firmer than on boiler rivets, and that there is no shading of the $1.50 price on the former.

Merchant Steel.—Shipments by the mills this month will show an increase over June. The implement makers are specifying very freely against contracts and new demand is active. Prices are firm and in small lots are as follows: Iron finished tire, ½ x 1½ in. and larger, 1.40c., base; under ½ x 1½ in., 1.55c.; planished tire, 1.60c.; channel tire, ¾ to ⅞ and 1 in., 1.90c., to 2c.; 1⅛ in. and larger, 2c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.75c.; concave and convex, 1.80c.; cutter shoe, tapered or bent, 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth finish, 1.80c.

Nuts and Bolts.—Most consumers covered their needs over remainder of the year before the recent advance in prices was made, but new buying is fairly strong for small lots. The higher prices are being firmly held. Discounts to the trade as adopted June 30 are as follows:

U. S. S. Cold Punched Blank and Tapped, Chamfered, Trimmed and Reamed

½ in. and smaller, hex.....7.8c. per lb. off
⅝ in. and larger, hex.....7.1c. per lb. off
Square, all sizes .....5.6c. per lb. off

Semi-Finished Tapped

½ in. and smaller hex.....85-10-10-5 off
⅝ in. and larger hex.....85-10-5 off

Black Bulk Rivets

7/16 x 6½, smaller and shorter.....80-10-5 off

Package Rivets 1000 Pcs.

Black, metallic tinned and tin plated....75-10-10 off

Discounts on bolts as recently adopted are as follows:

Common carriage bolts, ⅜ x 6, S. & S. rolled, 75-10-10; cut, 75-10-5; larger or longer, 75-5. Machine bolts, h. p. nuts, ⅜ x 4, S. & S. rolled, 75-2/10-5; cut, 75-2/10; larger or longer, 75-5. Machine bolts with C. P. & C. & T. nuts, ⅜ x 4, S. & S., 75-10; larger or longer, 75. Bolts without nuts, 6 in. and shorter extra 10 per cent; longer lengths, extra 5 per cent. G. P. coach screws, 75-2/10-5. Nuts, blank or tapped, h. p. square, 6.20; hexagon, 7.00.

Wrought Pipe.—New buying of merchant pipe this month will likely show a slight increase over June, but mills report that oil country goods are dull, with prices ruling low. The National Tube Company will start early in August its Riverside works at Wheeling, W. Va., which have been down for about eighteen months. The Natural Gas Company of West Virginia has placed an order with a Youngstown mill for twenty-eight miles of 8-in. line pipe. It is stated discounts on iron and steel pipe are firmly held.

Boiler Tubes.—Effective on Friday, July 16, prices on lap-weld steel and iron boiler tubes were lowered one point, equal to an advance of about $2 a ton. The new discounts on steel tubes are given on page 209.

Coke.—The local market is quiet, and it is being offered at lower figures, the recent demand for prompt furnace coke having largely disappeared. There is some inquiry for foundry coke for last quarter and several contracts have been made at fairly good prices. We quote standard makes of prompt furnace coke at $1.60 per net ton at oven; on contracts for delivery up to Jan. 1, $1.75; standard 72-hr. foundry coke at $2 to $2.25 for prompt delivery, and $2.25 to $2.50 on contracts. Output of coke is getting steadily heavier, last week showing a gain of several thousand tons over the previous week. The H. C. Frick Coke Company is starting up this week about 300 more ovens, and nearly all its plants are working six days per week.

Old Material.—The local scrap trade is showing betterment in prices and also in demand. A local consumer is offering $12.50, delivered at its mills, for selected heavy steel melting stock, but dealers are holding for $12.75 and up to $13. Another local consumer is buying scrap in different parts of the country and recently made a purchase at Buffalo, N. Y., for delivery to its mills here. Since July 2 there has been an embargo on scrap destined for the Pittsburgh Steel Company at Monessen, Pa. Prices on heavy steel scrap, bundled sheet scrap, borings and turnings and low phosphorus melting stock are higher. We note sales of 500 tons of selected heavy steel scrap at $12.75, 1000 tons at the same price for delivery to mills in the Pittsburgh district. Prices on heavy steel scrap for delivery at Youngstown and Steubenville, Ohio, are lower than the above figures. Dealers are asking higher prices and are freely offering $12.50 for heavy steel scrap, but are not getting it. They have advanced prices on nearly all grades of scrap, and are now quoting as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	$12.50 to $12.75
Compressed side and end sheet scrap.	11.50 to 11.75
No. 1 foundry cast	12.00 to 12.25
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	9.75 to 10.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	11.75 to 12.00
No. 1 railroad malleable stock	11.00 to 11.25
Railroad grate bars	8.00 to 8.25
Low phosphorus melting stock	15.75 to 16.00
Iron car axles	18.75 to 19.25
Steel car axles	13.75 to 14.00
Locomotive axles, steel	19.75 to 20.25
No. 1 busheling scrap	10.25 to 10.50
No. 2 busheling scrap	7.75 to 8.00
Machine shop turnings	7.50 to 7.75
Old carwheels	11.75 to 12.00
Cast-iron borings	9.00 to 9.25
*Sheet bar crop ends	12.00 to 12.25
Old iron rails	12.75 to 13.00
No. 1 railroad wrought scrap	11.50 to 11.75
Heavy steel axle turnings	9.00 to 9.25
Heavy breakable cast scrap	11.00 to 11.25

*Shipping point.

Chicago

CHICAGO, ILL., July 21, 1915.—(*By Wire.*)

The advance in the price of heavy steel products to the basis of 1.30c., Pittsburgh, while measuring more accurately the progress of the Eastern situation, is not out of line with developments in the West, so rapidly has the market been strengthened by reason of orders placed. That some of this gain arises from tonnage from outside the territory is true, probably to the extent of nearly one-fourth of the monthly bookings of local mills, but this does not detract from the improvement recorded in business of local origin. There is also little evidence of purely speculative buying against a rising market. The bulk of steel bar, shape, and plate sales has been made to the implement interests and car builders, all of which will be promptly manufactured into finished product. Against orders from fabricators there may be offset an aggregate of nearly 5000 tons of small structural jobs placed last week and at least an equal tonnage upon which figures are now out. Aside from several hundred cars made up of small lots, inquiry includes a total of nearly 25,000, the placing of which is considered imminent. The market, however, seems not to have quite reached the level of 1.489c., Chicago, particularly as regards plates, and 1.20c. to 1.25c., Pittsburgh, can still be done. The available business in rails is still far short of the capacity of the mills. The galvanized sheet trade continues in a state of collapse with the mills unwilling to buy spelter which might not be delivered until after a sharp drop in the market, but some sales of galvanized are noted at prices equivalent to 4.60c. f.o.b. mill. The market on bolts shows signs of a return to normal prices, although unsettled conditions have not entirely disappeared. Concessions in the price of wire nails are reported as inducements to the placing of fall business. Inquiry for pig iron, especially from the malleable foundries, is more active and the demand for castings is apparently improving. The demand for steel scrap features the market for old material and is the nucleus of an upward movement in prices.

Pig Iron.—Purchases of about 3000 tons of Southern foundry iron of 3 per cent silicon analysis by a manufacturer of railroad equipment and a like amount of malleable iron for a Chicago foundry were the largest transactions of the past week, but the number of sales of smaller tonnage was such as to give the market a noticeably increased importance. Inquiry especially for malleable iron is more active and trading has lost some of the listlessness which has character-

it for some time. The firmness with which local s are being held is more impressive, but transac- s in Southern iron lead to some doubt as to the ct minimum at which purchases can be made. It hardly be said that the market is firm at $10, Bir- gham. The following quotations are for iron de- red at consumers' yards, except those for Northern ndry, malleable Bessemer and basic iron, which are b. furnace, and do not include a switching charge raging 50c. a ton.

Lake Superior charcoal, Nos. 2 to 5	$15.75
Lake Superior charcoal, No. 1	16.25
Lake Superior charcoal, No. 6 and Scotch	16.75
Northern coke foundry No. 1	$13.50 to 13.75
Northern coke foundry, No. 2	13.00 to 13.50
Northern coke foundry, No. 3	12.50 to 13.00
Southern coke, No. 1 f'dry and 1 soft.	14.25 to 14.50
Southern coke, No. 2 f'dry and 2 soft.	13.75 to 14.00
Malleable Bessemer	13.00 to 13.25
Standard Bessemer	16.50
Basic	12.50 to 13.00
Low phosphorus	20.00 to 20.50
Jackson Co. and Ky. silvery, 8 per cent.	16.50 to 17.00
Jackson Co. and Ky. silv'y, 10 per cent.	17.50 to 18.00

(*By Mail*)

Rails and Track Supplies.—Rolling about 50,000 s per month, Chicago rail mills are conspicuously ow their capacity in comparison with the opera- ns of the finishing departments for other products. w orders for rails have been under 5000 tons in the t week, made up of small lots, and, in July, total ecifications have not exceeded 35,000 tons. Track steners, including tie plates, are held at much firmer otations and it is doubtful if present tie plate prices n long be duplicated. We quote standard railroad ikes at 1.50c. to 1.55c., base; track bolts with square ts, 1.90c. to 2c., base, all in carload lots, Chicago; tie ates, $24 to $25, f.o.b. mill, net ton; standard section ssemer rails, Chicago, 1.25c., base, open-hearth, 4c.; light rails, 25 to 45 lb., 1.07c.; 16 to 20 lb., 2c.; 12 lb., 1.17c.; 8 lb., 1.22c.; angle bars, 1.50c., icago.

Structural Material.—Inquiry as to whether the or- rs for plain material being placed by fabricators are cked up by business on their own books is answered part by the increased number of contracts placed st week. An aggregate of ten structural jobs is oted for a total of 4350 tons. These include 1100 tons r the International Tailoring Company Building, Chi- go; 692 tons for the Illinois Building, Champaign, warded to the Decatur Bridge Company; 500 tons for urlington Railroad girder spans, to the American idge Company; 764 tons for a railroad viaduct at arshalltown, Iowa, to the Minneapolis Steel & Ma- inery Company, and 542 tons for transmission wers for the Iowa Railway Light & Power Company, the Archbold-Brady Company. Several other con- acts of 200 tons and less also were placed. The Chi- go, Burlington & Quincy has divided its order for rs, placing 1000 each with the American Car & oundry Company and the Bettendorf Axle Company. he steel for these cars is to be placed immediately. o further definite information is available concerning e arrangements for the remaining 8000 cars of the 2,000 for which the Russian Government made in- iry. The expected purchase of 5000 cars by the nion Pacific and 8000 by the New York Central lines reported. Specifications covering car steel have been nning very heavy, the bookings of one day aggre- ating 20,000 tons. Since July 1, orders for nearly 0,000 tons of structural shapes have been taken by cal mills. The advance in mill prices to the base of 30c., Pittsburgh, is established with particular strength by those mills under the influence of the East- rn situation, some of whom are now quoting two and hree months' delivery. As yet little business has been aken at these new prices. We quote for Chicago de- ivery of plain material from mill 1.439c. to 1.489c.

The warehouse trade has not yet begun to feel the in- fluence of longer mill deliveries, but some increase in sale tonnages is being made from week to week. We quote for Chicago delivery of plain material from store 1.75c.

Plates.—The plate market is moving upward with ess uniformity of quotations than is true of shapes and ars, but this is accepted as a natural sequence of the situation that has prevailed. One purchaser claims to have bought plates for prompt shipment last week at 1.15c., while quotations of 1.20c., Pittsburgh, are admitted by some of the mills. Eastern interests which have benefited much more largely with respect to plates than some of the independent mills of the Central West have brought their plate quotations up to a level with structural steel and bars, but Western mills are well content with $1 a ton less. We quote for Chicago delivery of plates from mill 1.389c. to 1.439c.

We quote for Chicago delivery of plates out of store 1.75c.

Sheets.—Orders for galvanized sheets were placed in this market last week at prices as low as 4.75c., Chicago, but other sales of No. 28 gage were made at 4.75c., Pittsburgh. Although prices now are less than the maximum of a few weeks ago, trade in galvanized sheets is none the less restricted, largely because the mills are unwilling to assume the risk involved in accepting this business on the basis of the present price of spelter which may not be delivered for thirty days. The sale of black sheets grows very slowly. We quote for Chicago delivery from mill No. 10 blue annealed, 1.489c.; No. 28 black, 1.939c.; No. 28 galvanized, 4.75c. to 5.939c.

We quote for Chicago delivery from jobbers' stocks as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.55c.; No. 28 galvanized, 4.85c.

Bars.—Steel-bar specifications are running heavier than those of any other product. The Pettibone-Mulliken Company, which has taken a large ammunition order, is understood to have placed 10,000 tons of 4½-in. rounds. Implement specifications are running into large totals. A better tonnage of reinforcing bars is up for figures, and the hard steel mills report the situation to be slowly improving. Bar iron alone displays little animation, although the quotation of 1.20c. appears to be unquestioned. We quote for mill shipment as follows: Bar iron, 1.20c.; soft steel bars, 1.489c.; hard steel bars, 1.20c.; shafting, in carloads, 65 to 68 per cent off; less than carloads, 60 per cent off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c., base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 60 per cent off, and in carloads, 62 per cent off.

Rivets and Bolts.—To what extent the scramble for railroad bolt contracts resulted in concessions from the manufacturers' published quotations is indicated by the taking of some of this business at discounts of 85-5 off for small machine bolts and 80-5 off for larger sizes, while for carriage bolts some of the contracts show discounts of 85 off for the small sizes and 80 off for the large. With this important business closed, there has been a natural reaction toward the entirely nominal prices quoted below. The marked strength in bars has contributed a substantial support to rivet prices which are still being sold at an admittedly small spread over bars. Quotations are as follows: Carriage bolts up to ⅜ x 6 in., rolled thread, 80-10; cut thread, 80-5; larger sizes, 75-15; machine bolts up to ⅜ x 4 in., rolled thread, with hot pressed square nuts, 80-15; cut thread, 80-10; larger sizes, 80; gimlet point coach screws, 85; hot pressed nuts, square, $6.40 off per cwt.; hexagon, $7.30 off per cwt. Structural rivets, ¾ to 1¼ in., 1.65c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2c.; boiler rivets, 2.10c.; machine bolts up to ⅞ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to ⅞ x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square, $6, and hexagon, $6.70 off per cwt.

Wire Products.—The approaching season in which fall business will be solicited from jobbers is throwing a strong light upon prices and it is already evident that better than 1.60c., Pittsburgh, for nails can be done. Some of the buyers are claiming quotations as low as 1.50c., while mill quotations of 1.55c. are conceded. The movement of fence wire is being retarded because of the higher prices imposed upon galvanized products and fall tonnage seems likely to suffer. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, $1.589; wire nails, $1.739 to $1.789; painted barb wire, $1.889; galvanized barb wire, $2.689; polished staples, $1.889; galvanized staples, $2.689; all Chicago.

Cast-Iron Pipe.—The leading interest is the low bidder on the Covington, Ky., lot of pipe amounting to about 3400 tons, but aside from this business there is little municipal tonnage in sight. At Ahmeek, Mich., 275 tons; at Keota, Iowa, 325 tons, and at Kenosha, Wis., 1200 tons constitute the most of the business in prospect. Routine orders upon which principal dependence is placed at this season show noticeable improvement. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $26; 6 to 12 in., $24; 16 in. and up, $23.50, with $1 extra for Class A water pipe and gas pipe.

Old Material.—An exceptionally active demand for steel scrap is the feature of the market. The demand from the leading consumer, in particular, is such that all of the available material is being absorbed. No. 2 wrought scrap, through its relationship to shoveling steel, is appreciably stronger, and other grades of more remote connection are being held at higher prices through the same general strengthening influence. Offerings of railroad scrap are negligible. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	$12.25 to $12.50
Old steel rails, rerolling	10.25 to 10.75
Old steel rails, less than 3 ft	10.50 to 11.00
Relaying rails	19.50 to 20.50
Old carwheels	11.25 to 11.50
Heavy melting steel scrap	10.50 to 10.75
Frogs, switches and guards, cut apart	10.50 to 10.75
Shoveling steel	10.00 to 10.25
Steel axle turnings	7.50 to 7.75

Per Net Ton

Iron angles and splice bars	$12.25 to $12.75
Iron arch bars and transoms	12.50 to 13.00
Steel angle bars	9.50 to 9.75
Iron car axles	14.00 to 14.25
Steel car axles	10.00 to 10.50
No. 1 railroad wrought	9.25 to 9.50
No. 2 railroad wrought	9.00 to 9.25
Cut forge	9.00 to 9.25
Steel knuckles and couplers	9.50 to 9.75
Steel springs	9.50 to 9.75
Locomotive tires, smooth	9.25 to 9.50
Machine shop turnings	5.25 to 5.75
Cast borings	5.25 to 5.75
No. 1 busheling	7.25 to 7.75
No. 2 busheling	6.25 to 6.75
No. 1 boilers, cut to sheets and rings	5.50 to 6.00
Boiler punchings	8.25 to 8.50
No. 1 cast scrap	9.25 to 9.75
Stove plate and light cast scrap	8.25 to 8.50
Grate bars	7.75 to 8.25
Railroad malleable	8.75 to 9.25
Agricultural malleable	8.25 to 8.50
Pipes and flues	6.75 to 7.00

Philadelphia

PHILADELPHIA, PA., July 20, 1915.

That the steel business is active and foundry pig iron very quiet, broadly sums up the situation. The larger mills are asking 1.309c., Pittsburgh, or 1.459c., Philadelphia, for plates, shapes and bars, but quotations are not without variation, particularly for plates and shapes. Both of these can be had without difficulty at 1.409c., Philadelphia, and it is not improbable that the same figure might be accepted for a desirable order of bars. The export business still represents a large proportion of the activity, although one mill is so filled with domestic orders that it is declining to quote on foreign inquiries. Ocean freight space is now more easily obtained. The miscellaneous demand for sheets has grown and quotations are higher. The one encouraging feature in pig iron is the stiffer prices and the feeling that furnaces' stocks will be disposed of at a profitable price. The trade cannot but believe that the spreading of activity as a result of the war business will ultimately reach pig iron. More foundries already are reported busier. Basic iron is quiet but the outlook is promising. The aggregate of current sales of low phosphorus is satisfying. The smaller furnace of the Alan Wood Iron & Steel Company at Swedeland, Pa., broke out at the bottom early last week. It produced 350 tons a day, and the mishap hastened the blowing-in, July 12, of the company's large furnace which makes 500 tons a day. The smaller furnace will have to be relined. Ferromanganese is more active, both as regard the English and domestic product. Old material is in better demand than in many months. Coke is strong and shows a tendency to advance.

Pig Iron.—Foundry grades continue extremely qu and without feature except for a stiffening in pr which, in the absence of encouraging sales, can be ascribed to sentiment engendered by the active market. There are fewer sellers under $14.50, de ered here. With all other markets showing impro ment, producers are puzzled that foundry iron sho lag at the tail-end of the procession. They believe t stocks on furnace banks will bring better than pre ing prices, and the entire sentiment is better, in p because of instances in which the melt shows an crease. Some eastern Pennsylvania makers are ask $14 to $14.50, furnace, for No. 2 X, to which must added 79c. freight rate. On the other hand No. 2 can be had without difficulty at $14.50, delivered. carwheel manufacturer is inquiring for 1000 tons iron, but wants deliveries to run into next year the trade is not eager to quote. Basic has been active, except for 2000 tons for immediate deliv which was purchased by a nearby mill to meet an em gency. Something less than $14 was paid. It is point out that with more basic being consumed, buying ca not be far off. For standard low phosphorus the c rent demand has been active, though no large l have been involved. Sales have been made on a ba of $21.50 to $21.75, delivered. From one produc Canadian consumers have taken about 1500 tons in t week. In the same period about 1700 tons of Leban low phosphorus was purchased. Virginia iron has be quieter and Southern likewise. An offer of $9 Birmingham, for No. 2, was declined, the maker ho ing for $10. Quotations for standard brands for ear delivery in buyers' yards in this district are as follow

Eastern Penna. No. 2 X, foundry	$14.25 to $14.75
Eastern Penna. No. 2 plain	14.00 to 14.50
Virgina, No. 2 X, foundry	15.25 to 15.75
Virgina, No. 2 plain	15.00 to 15.25
Gray, forge	13.25 to 13.50
Basic	14.00
Standard low phosphorus	21.50 to 21.75

Ferroalloys.—Lots of 80 per cent ferromangane ranging from 50 to 250 tons, for future delivery, a subject to ability to ship, have been purchased to increased extent. It is reported that some of t larger consumers are running short, which is to expected with the increased production of steel. Th are now at least three sources from which domes ferromanganese can be obtained in limited quantiti the product of Brazilian ores. It is being sought the reason that some of the steel mills cannot eas comply with England's requirement of a guarantee to the ultimate consumer of the steel into which En lish alloy enters. The difficulty is apparent when is considered that sales are made through expo houses, acting for principals abroad. Practically all the Brazilian ore is coming from three mines, one which is practically controlled by a large steel co pany, while the output of the two others is handl by two dealers, one in Philadelphia and one in Ne York. One of these has conversion arrangements wi three concerns. The quotation is unchanged at $1 seaboard, for foreign ferromanganese, and the domes product is on the same basis, although a case is men tioned where a freight rate of $1.25 was waived. Ferr silicon, 50 per cent, is quoted at $71 to $73, Pittsburg according to quantity.

Bars.—For prompt deliveries of steel bars loc sellers are asking 1.30c., Pittsburgh, or 1.459c., Phil delphia, and fourth quarter business would be take on the same basis. At the same time, a good propo tion probably would go through at 1.409c. Most the larger consumers closed to the end of the year the quotations which prevailed at the end of the se ond quarter. The week has been good in point specifications, but new business has not been ove active. Perhaps 60 per cent of the local business ha been for export. The movement in iron bars continue good, the asking price being 1.25c., mill, or 1.35c. Philadelphia. Lower could be done. A Pennsylvani company working on a shell contract purchased 250 tons of steel bars this week. The price was 2.40c.

Plates.—The mills are busy to almost full capacity the representative of one declaring that the activity i the best of the past two or three years. The demand appears to come from every direction. Quotations for this quarter range from 1.409c. to 1.459c., Philadelphia

the last quarter, one maker is asking 1.509c., Philadelphia.

Structural Material.—The tone of the market is better and local sellers are getting 1.459c., Philadelphia, on what they term "pick-ups." They are endeavoring to get out of the fourth quarter. Specifications against contracts at lower prices than now prevail are appearing in good volume, though not heavily. An Eastern mill is operating about 70 per cent of capacity. On a certain proposition 1.409c., Philadelphia, would be done. The only new local fabricating proposition mentioned is a railroad freight shed in Federal Street, this city, the tonnage of which is not yet determined.

Sheets.—The 1.509c., Philadelphia, quotation is declared to have practically disappeared and the mills are now asking 1.559c. to 1.609c. The demand is good, and general in character.

Billets.—The active demand has been maintained and billets are now so scarce that the mills have been buying among themselves to supply urgent demand. In one maker business has developed to such an extent that he has ceased quoting on foreign inquiries. The several thousand tons which were sold recently by the Steel Corporation by one local maker, some will be delivered to Pencoyd, but the larger proportion will go to Ellwood City, Pa. Rolling billets are quoted at $25.56 to $25.06, Philadelphia. For rolling steel $4 to $5 per ton more is asked, according to specifications.

Coke.—The market is decidedly stronger. Furnace coke has been bought for delivery to September at $1.80 to $1.85 per net ton at oven, while one maker has asked $1.90, immediate acceptance. It is predicted that the price will go to $2 very shortly. Prompt and contract foundry coke ranges from $2.50 to $2.70 per net ton at oven. Prices are in process of readjustment and ordinary differentials are more or less lacking. Freight rates from the principal producing interests are as follows: Connellsville, $2.05; Latrobe, $1.85, and Fountain, $1.65.

Old Material.—The scrap market is more active than at any time in the past year. Eastern steel mills have been buying to a very good extent as compared with recent lack of activity, and are taking a variety of materials. Heavy melting steel has sold at $12.25, $12.30 and $12.50. Up to $13 is asked. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates from 35c. to $1.35 per gross ton, are as follows:

No. 1 heavy melting steel	$12.25 to $12.75
Old steel rails, rerolling, nom	13.00 to 13.50
Low phos. heavy melting steel scrap	15.00 to 15.50
Old steel axles	14.25 to 14.75
Old iron axles, nom	18.00 to 18.50
Old iron rails, nom	15.50 to 16.00
Old carwheels	12.50 to 13.00
No. 1 railroad wrought	13.75 to 14.25
Wrought-iron pipe	11.00 to 12.00
No. 1 forge fire	9.00 to 9.50
Bundled sheets	9.25 to 9.75
No. 2 busheling	7.75 to 8.25
Machine shop turnings	8.75 to 9.25
Cast borings	8.50 to 9.00
No. 1 cast	12.50 to 13.00
Grate bars, railroad	9.50 to 10.00
Stove plate	9.50 to 10.00
Railroad malleable, nominal	10.00 to 10.50

Buffalo

BUFFALO, N. Y., July 20, 1915.

Pig Iron.—The market exhibits a very cheerful temper. Some improvement in inquiry is noted, a portion of it being for delivery over the first part of next year. Furnacemen, however, are not inclined to quote on 1916 business, except at a very considerable advance. Sellers are looking for higher prices, if present conditions continue. Trade differentials are more prominently in force, with a range of $12.50 for gray forge to $13.50 for high silicon irons. We quote as follows, f.o.b. furnace Buffalo, for last half delivery:

No. 1 foundry	$13.00 to $13.50
No. 2 X foundry	12.75 to 13.00
No. 2 plain	12.50 to 12.75
No. 3 foundry	12.50 to 12.75
Gray forge	12.50
Malleable	12.50 to 13.00
Basic	13.00 to 13.50
Charcoal, regular grades and analysis	15.75 to 17.25
Charcoal, special grades and analysis	19.00 to 20.00

Finished Iron and Steel.—Reports indicate a revival in nearly all lines and plants that were running on part time are now commencing to receive orders that will in some instances schedule them practically full for a considerable time ahead. Many users of steel find it necessary to buy material from warehouse stocks because of rather extended mill deliveries, the principal interest now being from three to four months behind on bars and from six to eight weeks on plates and shapes. All of the selling agencies in this market have advanced their prices so that 1.30c. represents the minimum for prompt specifications with some sellers asking 1.35c. for fourth quarter. It is understood that mill stocks of structural material and plates have been practically exhausted and the leading interest announces that prices on warehouse stocks of bars, plates and shapes have been advanced $2 per ton, effective July 19, making the base price on bars 1.85c. and on plates and shapes 1.90c. The development of a good inquiry for shapes is reported, particularly structural, which, although mostly for small lots, aggregates a large tonnage. Fabricators state that the situation is improving rapidly and that a large number of erection jobs, both large and small are being figured. Fabricating prices have a stiffening tendency in consequence. The Buffalo Bolt Company, Tonawanda, N. Y., is taking bids for a plant addition requiring 300 tons. The Archer-Daniels Company, of Minneapolis, is preparing plans for a linseed oil mill and elevator on the Buffalo River, Buffalo, requiring about 700 tons for the mill. The type of construction for the elevator has not yet been definitely decided, but will probably be steel bins with structural steel headhouse. The Buffalo Forge Company is putting up a plant addition requiring 700 tons and is doing its own fabricating. The John W. Cowper Company, Buffalo, has received a contract for an additional building for the Schoellkopf Aniline & Chemical Works, this city, and has sublet the steel, 565 tons, to the Ferguson Steel & Iron Company, Buffalo. The Lackawanna Bridge Company, Buffalo, has taken 200 tons for the Gurney Ball Bearing Company plant, Jamestown. The Kellogg Structural Steel Company, Buffalo, took the contracts for Martins Hotel, Utica, and the St. Elizabeth Hospital, New Hartford, N. Y., 100 tons and 200 tons respectively; the 300 tons for School No. 14, Rochester, went to the Genesee Bridge Company, of Rochester, and 150 tons for a crane runway extension for the Pennsylvania General Electric Company's plant at Erie, Pa., to the Riter-Conley Company, Pittsburgh. The Eastern Concrete Steel Company, Buffalo, has the reinforced concrete mill and elevator building for the Clover Leaf Milling Company, this city, requiring about 400 tons of reinforcing bars. The Lackawanna Steel Company, Buffalo, has taken about 60,000 tons of the Russian rail order recently placed in this country.

Old Material.—The market continues on the upgrade and inquiry is active and sales of good volume in nearly all lines. Both users and dealers appear to be taking advantage of the present level of prices to provide for seasonable requirements ahead before any rise, which dealers anticipate, shall materialize. We quote dealers asking prices, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$10.75 to $11.00
Low phosphorus steel	13.00 to 13.50
No. 1 railroad wrought scrap	10.50 to 11.00
No. 1 railroad and machinery cast	11.00 to 11.50
Old steel axles	12.00 to 12.50
Old iron axles	16.00 to 16.50
Old carwheels	11.50 to 12.00
Railroad malleable	10.50 to 11.00
Machine shop turnings	5.75 to 6.25
Heavy axle turnings	8.50 to 9.00
Clean cast borings	6.75 to 7.00
Old iron rails	11.00 to 11.50
Locomotive grate bars	9.00 to 9.50
Stove plate (net ton)	8.25 to 8.75
Wrought pipe	7.00 to 7.50
Bundled sheet scrap	7.25 to 7.75
No. 1 busheling scrap	8.50 to 9.00
No. 2 busheling scrap	6.50 to 7.00
Bundled tin scrap	9.00

The Bureau of Mines has just issued Technical Paper 84, "Methods of Preventing and Limiting Explosions in Coal Mines," by George S. Rice, chief mining engineer, and L. M. Jones, mining engineer.

Cincinnati

CINCINNATI, OHIO, July 21, 1915.—(*By Wire.*)

Pig Iron.—Changes in the Southern foundry iron situation in the past few days have been so sudden that the trade does not yet realize their imports. In this market alone something like 40,000 tons of Southern foundry iron was sold last week in speculative deals and for delivery in the last quarter. Definite information as to the price paid is not obtainable, but it is understood that part was bought at $10, Birmingham basis. A Cincinnati foundry also bought 4200 tons of Southern and Northern foundry grades for fourth quarter shipment and 500 tons of Southern iron was taken by another local melter for third quarter delivery. It is understood that nearly all of the cheap iron in the South has now been disposed of and the minimum prompt shipment price is $9.75, Birmingham basis, with only a small tonnage available at this figure. The majority of Southern furnaces are holding firm at $10 for any shipment this year and one interest is marking up prices to $10.50. Not much business is reported in Northern foundry pig iron and the largest sale recorded is for 500 tons to an Indiana firm for last half shipment. There is an inquiry out for approximately 500 tons of Northern iron for an Ohio melter. Northern foundry No. 2 is quoted firm at $12.50, Ironton, but contracts can be made for shipment during the remainder of the year at this same figure. An Indiana manufacturer bought last week 1000 tons of malleable pig iron and it is understood that the business went to a Lake furnace. Considerably more interest is manifested in basic pig iron as the rolling mills are melting more than the usual tonnage at the present time. Based on freight rates of $2.90 from Birmingham and $1.26 from Ironton, we quote, f.o.b. Cincinnati, as follows.

Southern coke, No. 1 f'dry and 1 soft	$13.15 to $13.65
Southern coke, No. 2 f'dry and 2 soft	12.65 to 13.15
Southern coke, No. 3 foundry	12.15 to 12.65
Southern No. 4 foundry	11.65 to 12.15
Southern gray forge	11.15 to 11.65
Ohio silvery, 8 per cent silicon	16.01 to 16.26
Southern Ohio coke, No. 1	14.76 to 15.26
Southern Ohio coke, No. 2	13.76 to 14.26
Southern Ohio coke, No. 3	13.51 to 13.76
Southern Ohio malleable Bessemer	13.76 to 14.01
Basic, Northern	13.76 to 14.01
Lake Superior charcoal	16.20 to 17.20
Standard Southern carwheel	26.90 to 27.40

(*By Mail*)

Finished Material.—There is an improvement noted in most all lines and in steel bars especially. The business now transacted is on a basis of 1.30c., Pittsburgh. Local warehouse quotation on steel bars remains around 1.80c. There is a slightly better inquiry for galvanized sheets for future delivery, but the nearby mills are still holding out for 5c., Pittsburgh, on contract business. However, No. 28 galvanized sheets may be obtained for prompt shipment from local warehouses at 4.50c., though only a limited stock is available. The substitution of black sheets for galvanized has been successful to a certain extent and the mills are probably shipping out a larger tonnage of black sheets than of the galvanized product. Railroad track material shows some improvement. Wire nails are in better demand due to some stimulation of building operations.

Coke.—While there is not very much contracting for future foundry or furnace coke, prices have stiffened considerably and Connellsville 72-hr. coke is now quoted all the way from $2.25 to $2.60 per net ton f.o.b. cars at oven. The first named figure represents prompt shipment coke and cannot be inserted in contracts for all standard brands. The Virginia cokes are about on the same level and while there is some business reported for prompt shipment no large contracting is expected for some time to come, as the foundries are practically covered for this year's requirements. Connellsville furnace coke is quoted around $1.60 to $1.70, but no contracts for shipment beyond December will be accepted at the maximum figure named.

Old Material.—The market has made another advance of approximately 25c. a ton, and dealers report that the outlook is more encouraging. Some heavy contracting has been done lately, and it is also the general belief with the trade that present quotations are well established. The minimum figures given below represent what buyers are willing to pay for delivery their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices, f.o.b. yards:

Per Gross Ton		
Bundled sheet scrap	$6.75 to	$7.25
Old iron rails	11.00 to	12.00
Relaying rails, 50 lb. and up	19.75 to	20.25
Rerolling steel rails	9.00 to	9.50
Heavy melting steel rails	9.00 to	9.50
Per Net Ton		
No. 1 railroad wrought	$9.00 to	$9.50
Cast borings	5.00 to	5.50
Steel turnings	5.00 to	5.50
Railroad cast scrap	9.50 to	10.00
No. 1 machinery cast scrap	10.75 to	11.25
Burnt scrap	7.00 to	7.50
Old iron axles	14.00 to	14.50
Locomotive tires (smooth inside)	9.00 to	9.50
Pipes and flues	6.25 to	6.75
Malleable and steel scrap	7.50 to	8.00
Railroad tank and sheet scrap	5.50 to	6.00

Cleveland

CLEVELAND, OHIO, July 20, 1915.

Iron Ore.—The market is fairly active. A few round lot sales were made to steel companies during the week and additional inquiries are pending. Merchant furnaces so far have not bought much ore but some inquiry is now coming from this source. Some small lot sales are being made in the East. We quote prices as follows, delivered to lower Lake ports: Old Range Bessemer, $3.75; Mesaba Bessemer, $3.45; Old Range non-Bessemer, $3; Mesaba non-Bessemer, $2.8

Pig Iron.—The market is fairly active on nearly all grades and the good volume of business in the past week or two has resulted in a general stiffening of prices. Local furnaces have advanced prices on foundry grades to $13.50, delivered Cleveland, for No. 2 and $12.75 to $13 at furnace for outside shipment. The Massillon Iron & Steel Company, Massillon, Ohio, has an inquiry out for 10,000 tons of iron, one-half No. 3 foundry and the remainder No. 4 and gray forge. An inquiry from the Westinghouse Electric & Mfg. Company, for pig iron for its Cleveland and Pittsburg plants, is still pending. It is expected that this company will buy approximately 10,000 tons, although it is doubtful whether furnaces will quote prices that will be attractive for the first half delivery, for which some of the iron is wanted. A local consumer has taken 2000 tons of basic from a Cleveland furnace and the Portsmouth Steel Company is reported to have purchased a round block of basic from an Ashland, Ky., furnace which will be blown in. The Cleveland Furnace Company, which took a large block of basic iron from the Youngstown Sheet & Tube Company, expects to blow in its second stack on this iron next week. A leading malleable interest has purchased 1000 tons of malleable iron for its Indianapolis plant. The improvement in the demand and the advance in prices have extended to low phosphorus iron and a Cleveland interest reports sales aggregating about 5000 tons. Sales made by local agencies include 2000 tons of Southern charcoal iron in the Pittsburgh district. We note the sale of a 750-ton lot of Southern iron in this territory and some smaller lot sales. Considerable Southern iron was sold during the week at $9.50, Birmingham, for No. 2 and it is now claimed that this price has practically disappeared, $9.75 being the minimum quotation for prompt shipment and the third quarter. Considerable recent buying of Southern iron has apparently been of a speculative character, consumers taking more than they expected to need for the last half with a view of carrying it over to next year. We quote, delivered Cleveland, as follows:

Bessemer	$14.50	
Basic	$13.50 to	13.90
Northern No. 2 foundry		13.50
Southern No. 2 foundry	13.75 to	14.00
Gray forge		13.25
Jackson Co. silvery 8 per cent silicon	16.37 to	16.62
Standard low phosphorus at furnace	20.50 to	20.75

Coke.—Not much new business is coming out as most consumers are under contract. We note the sale of a round lot of 72-hr. Virginia furnace coke at $2.35 for delivery during the year. We quote standard Connellsville foundry coke at $2.25 to $2.50 per net ton at oven and furnace coke at $1.65 to $1.75.

Finished Iron and Steel.—The demand for steel is heavy and most mill agencies report that, in spite of the heavy volume of orders on expiring contracts placed during the last week in June, specifications during the first three weeks in July are ahead of the corresponding period of last month. One mill is still quoting steel bars, plates and structural material at 1.25c., Pittsburgh, for desirable orders, but all other leading mills have advanced their prices to 1.30c. Plates are firmer and 1.20c., Pittsburgh, now appears to be the minimum quotation. A number of new inquiries are pending for round lots of steel for shells and mills are now naming higher prices for this steel, quotations ranging from 2c. to 2.25c. and higher, as compared with 1.60c., at which some tonnage was taken a few weeks ago. Billets are in good demand and several small lot sales are reported at $22, Youngstown, for open-hearth billets for prompt shipment. Open-hearth sheet bars have sold at the same price for prompt shipment. Forging billets are selling at $28 and higher, Cleveland. New demand for structural material for building work is not active but some inquiry is pending for railroad bridge work. The demand for sheets is active and black sheets are firmer, 1.80c. being the usual quotation for No. 28 black. Blue annealed sheets are quoted at 1.35c. for No. 10 and galvanized at 4.50c. to 5.50c. for No. 28. There is a good demand for steel bars for reinforcing purposes. Hard steel bars are selling at 1.15c., Pittsburgh, and iron bars are quoted at the same price. The Cambridge, Ohio, plant of the Interstate Iron & Steel Company, Chicago, maker of hard steel bars, was burned July 18. Warehouse prices are unchanged at 1.80c. for steel bars and 1.90c. for plates and structural material.

Bolts, Nuts and Rivets.—There is a heavy demand for bolts and nuts from the automobile trade and other consumers, and some of the leading makers are three or four weeks behind on deliveries. The demand for heavy bolts used by the railroads is not so active as that for the smaller sizes. Prices are firm. Rivet prices are firmly maintained at 1.50c., Pittsburgh, for structural and 1.60c. for boiler rivets for the third quarter. Makers are charging 10c. additional for the last quarter in case of contracts for the last half. Bolt and nut discounts are as follows: Common carriage bolts, ⅜ x 6 in., smaller or shorter, rolled thread, 75, 10 and 10 per cent; cut thread, 75, 10 and 10 per cent; larger or longer, 75 and 10 per cent; machine bolts with h.p. nuts, ⅜ x 4 in., smaller or shorter, rolled thread, 75, 10, 10 and 10 per cent; cut thread, 75, 10, 10 and 5 per cent; larger or longer 75 and 15 per cent; coach and lag screws, 80 and 20 per cent; square h.p. nuts, blank or tapped, $6.30 off; hexagon h.p. nuts, blank or tapped, $7.10 off; c.p.c. and t-square nuts, blank or tapped, $5.80 off; hexagon, ⅝ in. and larger, $7.25 off; 9/16 and smaller, $8 off; semi-finished hexagon nuts, ⅝ in. and larger, 85, 10 and 10 per cent; 9/16 and smaller, 85, 10, 10 and 10 per cent.

Old Material.—Some heavy melting steel has been taken by Valley mills at $11.75 for delivery through August, but the demand is not active, most mills being well covered until September. Dealers are looking for better prices and are not inclined to sell short for future delivery. They claim that with the prices paid at present by the mills, they are unable to buy scrap and deliver it at a profit for early delivery. Steel axles are somewhat firmer. Turnings and borings continue a drug on the market and with prices weak. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton

Old steel rails, rerolling	$11.00 to $11.75
Old iron rails	12.00
Steel car axles	12.75 to 13.00
Heavy melting steel	10.50 to 11.00
Old carwheels	9.75 to 10.00
Relaying rails, 50 lb. and over	22.50
Agricultural malleable	8.50
Railroad malleable	10.25 to 10.50
Steel axle turnings	8.75 to 9.00
Light bundled sheet scrap	8.00 to 8.50

Per Net Ton

Iron car axles	$14.00 to $14.50
Cast borings	6.00 to 6.50
Iron and steel turnings and drillings	5.50 to 6.00
No. 1 busheling	8.50 to 8.75
No. 1 railroad wrought	9.25 to 9.50
No. 1 cast	9.75 to 10.25
Stove plate	8.00 to 8.25

Birmingham

BIRMINGHAM, ALA., July 19, 1915.

Pig Iron.—The Birmingham pig-iron market has apparently taken an upward turn. While sales in June were small, outside of those of one interest, and the same condition rules this month, recent bookings of large tonnages by that interest have been made on a basis of $10 for spot, with some contracts for last quarter at $10.50. This selling interest has advanced the price to $10.50 and a small tonnage has changed hands at that figure. The advance was secured on a firm offer without trading. Among the sales recorded is one of 3000 tons for immediate shipment at $10, a Southern contract for 10,000 tons for the rest of the year and orders for 2000 and 5000 tons respectively in competitive territory, all on the $10 basis. One small lot of No. 1 soft brought $11. The interests, which have for some time maintained the $10 level, report no difficulty in securing that price, but few sales are made. Speculators are in the market for 40,000 tons, but have not been accommodated. Offers of $9.75 for round tonnages of spot and forward delivery have been turned down. The inquiries for 1916 delivery are increasing, but sellers will not make quotations. If present conditions continue it is certain that there will be no 1916 iron under $10.25 to $10.50. A general confidence in an advancing market is expressed on all sides. This feeling was given special strength when the only interest, actively seeking buyers and placing orders in a few weeks' time for 80,000 tons, turned down $9.75 orders for spot, sold round lots for spot delivery at $10 and a forward one at $10.50, and went to the $10.50 basis. The remaining interests announce adherence to the $10 basis for the rest of the year, but are ready to jump on a moment's notice. It appears certain that the city furnace of the Sloss-Sheffield Steel & Iron Company will resume Aug. 1. Two Bessemer stacks of the Tennessee Company are being prepared, but no notice of resumption has been made. Steel works are busy. We quote per gross ton, f.o.b. Birmingham district furnaces, for spot and forward delivery, the former being extremely difficult to obtain, as follows:

No. 1 foundry and soft	$10.25 to $10.50
No. 2 foundry and soft	9.75 to 10.00
No. 3 foundry	9.25 to 9.50
No. 4 foundry	9.00 to 9.25
Gray forge	8.75 to 9.00
Basic	9.75 to 10.00
Charcoal	21.00 to 21.25

Cast-Iron Pipe.—No large orders are reported, but there has been a steady influx and prices remain firm at the 50c. advance recently announced. Gas and water pipe are continuously active and indications point to operations on a large scale during the remainder of the year. We quote per net ton, f.o.b. pipe shop yards, as follows: 4-in., $20.50; 6-in. and upwards, $18.50, with $1 added for gas pipe.

Coal and Coke.—The market is somewhat stiffer since the increase in local consumption of by-product coke and the withdrawal of so much of that output from the market. Beehive ovens find a ready sale for their output. Prices have not changed. We quote per net ton, f.o.b. ovens, as follows: Beehive foundry, $3 to $3.25; beehive furnace, $2.50 to $2.75; by-product, $2.25 to $2.50, with some grades higher. Some additional annual coal contracts have been secured by Birmingham operators and altogether they feel fairly well satisfied with the outlook for the first time in months. The domestic mines are becoming more active in filling yards. The De Bardeleben Coal Company will connect with the Warrior River for water transportation by a 6-mile tramway.

Old Material.—The market has improved somewhat in tone, although transactions have not gained much in volume. A gradual increase in mill and foundry activity points to better conditions. Prices are approaching some firmness. We quote per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	$13.00 to $13.50
Old steel axles	12.50 to 13.00
Old iron rails	12.50 to 13.00
No. 1 railroad wrought	8.50 to 9.00
No. 2 railroad wrought	7.50 to 8.00
No. 1 country wrought	8.00 to 8.50
No. 1 machinery cast	8.25 to 8.50
No. 1 steel scrap	8.00 to 8.25
Tram carwheels	8.25 to 8.50
Stove plate	7.00 to 7.50

St. Louis

ST. LOUIS, MO., July 19, 1915.

Pig Iron.—The market has been a little more active the past week and considerable business has been done, though there have been very few inquiries, none of which are now outstanding unfilled. The sales have ranged from 500 tons down, all for last half delivery, with prices a little stiffer. The aggregate has been about 3000 tons. Foundries are still reporting no increase in business and they are probably operating at about 60 per cent of normal capacity. Despite the slow business in this territory prices have been marked up by some furnaces.

Coke.—But little business is reported. There is sharp competition in by-product coke. While it is quoted on the Connellsville basis for general market purposes there is little doubt but that it can be had locally as low as $4.80, delivered St. Louis.

Finished Iron and Steel.—Sales have shown some improvement in number and area of originating territory, but it is doubtful if the aggregate business is more than 60 per cent of normal. Some contracting ahead is reported for periods of three and even of six months, but none for very large quantities. The new price of 1.30c. has been well received and cannot be charged with checking business to any degree. The demand seems to be coming chiefly from car and locomotive builders. The agricultural interests are also busy and specifying freely. Structural shops report conditions better and the outlook for the future more encouraging. The foundries are quiet. Movement out of warehouse is very good, and prices are well held. We quote for delivery out of stock as follows: Soft steel bars 1.70c.; iron bars, 1.65c.; structural material, 1.80c.; tank plate, 1.80c.; No. 10 blue annealed sheets, 2c.; No. 28 black sheets, cold rolled, one pass, 2.55c.; No. 28 galvanized sheets, black sheet gage, 4.85c.

Old Material.—The market has been in an excitable state, with some increase in business, coming mostly from the territory north and east of St. Louis rather than from the immediate vicinity, though there has been some demand from the local and east side industries. The reports show that the improvement in business is moving westward, and the St. Louis territory proper is expected by the dealers to show definite improvement soon. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton	
Old iron rails	$10.75 to $11.00
Old steel rails, rerolling	10.25 to 10.50
Old steel rails, less than 3 ft.	11.25 to 11.50
Relaying rails, standard section subject to inspection	22.00 to 23.00
Old carwheels	9.75 to 10.00
No. 1 railroad heavy melting steel scrap	10.00 to 10.25
Shoveling steel	8.75 to 9.00
Frogs, switches and guards cut apart	10.00 to 10.25
Bundled sheet scrap	6.25 to 6.50
Per Net Ton	
Iron fish plates	$10.50 to $11.00
Steel angle bars	8.75 to 9.00
Iron car axles	14.50 to 14.75
Steel car axles	11.25 to 11.50
Wrought arch bars and transoms	12.50 to 12.75
No. 1 railroad wrought	9.00 to 9.25
No. 2 railroad wrought	8.50 to 8.75
Railroad springs	9.00 to 9.25
Steel couplers and knuckles	9.00 to 9.25
Locomotive tires, 42 in. and over, smooth inside	9.50 to 9.75
No. 1 dealers' forge	8.00 to 8.25
Mixed borings	5.50 to 5.75
No. 1 busheling	7.50 to 7.75
No. 1 boilers, cut to sheets and rings	6.00 to 6.50
No. 1 railroad cast scrap	8.50 to 9.00
Stove plate and light cast scrap	7.50 to 7.75
Railroad malleable	7.25 to 7.50
Agricultural malleable	6.75 to 7.00
Pipes and flues	7.00 to 7.25
Railroad sheet and tank scrap	6.75 to 7.00
Railroad grate bars	7.25 to 7.50
Machine shop turnings	6.00 to 6.25

The foreign trade department of the National City Bank of New York says in a recent bulletin: "Late reports from Chile show that material improvements are in progress on national railroads, and that double tracks are being laid at the more important points and steel and concrete bridges constructed. Nearly all these improvements are being made with material obtained from the United States."

New York

NEW YORK, July 21, 1915.

Pig Iron.—There is undoubtedly a better feeling among producers of foundry iron and the market is considered to be somewhat firmer, though without inquiries of any size to test its firmness. Buffalo sales lately reported at Eastern points indicate that some sellers are not adhering to the prices others are supposed to be making. Three instances are cited in which the price delivered in the East is figured back to not far from $12.25, Buffalo, for No. 2 X or for malleable iron. Whatever purchase has been made by the Eastern malleable syndicate, the inquiry did not come to New York offices. It is reported that some iron was bought by this interest at Buffalo. The increased melt of foundry iron is apparently limited to concerns which have had orders for castings from manufacturers of such machine tools as figure largely in war work. One furnace in the Lehigh Valley that has been out of blast for many months is about to start up. On the other hand a Schuylkill Valley furnace has been put out of commission by an accident. Some further Southern iron has been taken by speculative buyers and a larger amount of Southern iron is involved in the speculative purchases made in the Central West. The ore situation is little affected by recent resale transactions. In one of these a small amount of low-grade Lake ore was disposed of that had long been on stockpile. We quote at tidewater as follows: No. 1 foundry, $14.50 to $14.75; No. 2 X, $14.25 to $14.50; No. 2 plain, $13.75 to $14; Southern iron, $14.50 to $14.75 for No. 1 and $14.25 for No. 2.

Ferroalloys.—Restrictions in British shipments of ferromanganese are now indicated. The situation is mixed. Some representatives here of British producers are advised that August shipments will be abandoned and that they have had to turn down some orders for forward delivery. Other importers will have smaller receipts for July than for any month this year, but are not advised of a new policy of restriction. Sales of small lots of 25 to 150 tons are reported at $100, seaboard. Some of the larger consumers are getting low in their stocks of ferromanganese and are more anxious. The domestic product is becoming a more important factor. Some consumers who cannot guarantee that the steel into which the manganese goes will not reach the enemies of England, are reported to be turning to the domestic alloy where possible. The leading interest is apparently producing not more than enough for its own consumption and is out of the market, yet the domestic output from Brazilian and other ores is increasing with each week. There are at present four such producers, two Eastern furnaces and two electrolytic companies. Sales of their output are reported at $100, seaboard, and lower. An ore dealer has a conversion arrangement with an Eastern steel company besides one with an electrolytic company to convert Brazilian ore into ferromanganese. A cargo of 3800 tons of manganese ore from Brazil is reported to have arrived at Sparrows Point, Md. Ferrosilicon, 50 per cent, is very active, domestic as well as foreign sales being large and prices firmer. We quote $71 to $73, Pittsburgh.

Structural Material.—The improvement in sentiment continues, based in part on the influx of inquiries, though large projects are still slow in closing. Altogether, outside of about 35,000 tons of structural work for the metropolitan subways, there are over 35,000 tons of steel pending, all in large jobs and regarded as sooner or later to be favorably decided. All the mills do not seem to have given definite instructions that quotations are to be held strictly to 1.30c., Pittsburgh, but they are free to meet competition, with the result that 1.25c., Pittsburgh, is still a possible figure. Included in the list of fabricated structures under consideration may be mentioned a machine shop and a plate and angle shop for the Samuel L. Moore Corporation, totaling 1200 tons, and the Murray Hill Building, 8 East Thirty-ninth Street, taking 800 tons. Post & McCord are low bidders for the steel work for the Culver line portion of the subway system in Brooklyn, involving about 11,-

0 tons. Milliken Brothers have been awarded 2100 ns for piershed No. 7 at Balboa, Panama Canal, and 0 tons for transmission towers for Stone & Webster. ther structural awards include 450 tons for a Masonic emple at Syracuse, to Smith & Caffrey; 300 tons for e Tidewater Building, Fifty-fourth Street and Broadway, to the Hedden Iron Construction Company, and 0 tons for a building at Market and Halsey Streets, ewark, to S. L. Davis. Foreign demand for other an munition purposes is looking up covering a wide nge of products, and prices are ruling strong, with sertion from selling offices that they are likely to xceed domestic quotations, particularly in lines of nished material other than plain structural shapes. e quote mill shipments at 1.25c. to 1.30c., Pittsburgh, 1.419c. to 1.469c., New York, and for small lots om store we quote 1.95c. to 2c., New York.

Steel Plates.—Business at 1.20c., Pittsburgh, is still eing done. Eastern mills are, however, heavily engaged, and deliveries are not quite so prompt as was e case a few weeks ago. Not much foreign inquiry as materialized into orders. It is expected that the onsiderable volume of quiet inquiry for cars will early trengthen the market, which is chiefly weak in universal plates. We quote 1.20c. to 1.25c., Pittsburgh, or 1.369c. to 1.419c., New York, the higher figure being harged for the smaller lots and for fourth quarter. Plates from store are 1.95c. to 2c., New York.

Iron and Steel Bars.—Since the last report some ills have raised bar iron to a basis of about 1.20c. at ill, and the American Iron & Steel Mfg. Company has nnounced a still further increase of $1 a ton in bar ron and $2 advance in track fastenings, as well as a trengthening of bolts, nuts, rivets, etc. It is not yet lear at this writing how generally this will stiffen the narket, but in the absence of information to the contrary, iron prices are here quoted $1 higher than last week. The outstanding feature in steel bars is the ontinued inflow of inquiry for large rounds for explosive shells, which steel is becoming increasingly difficult to obtain. With the well booked condition of ar mills, the price situation is strong, but it is not yet clear that this market is altogether up to 1.30c., Pittsburgh. We quote mill shipments of steel bars at 1.25c. to 1.30c., Pittsburgh, or 1.419c. to 1.469c., New York, and refined iron bars 1.30c. to 1.35c., New York. Out of store in New York iron and steel bars are 1.90c. to 1.95c.

Cast-Iron Pipe.—The results of public lettings of Monday are not available at this writing. Not much new work of this character has come into the market, but mention may be made of 400 tons for Maywood, N. J., to be bid on July 26 and 20 miles of pipe up to 20 in. in diameter for Watervliet, N. Y., to be bid on Aug. 16. Private buying continues fair and prices are firm, as follows: Carload lots of 6-in., Class B and heavier, are quoted at $22.50 to $23, per net ton, tidewater, Class A and gas pipe taking an extra of $1 per ton.

Old Material—Demand is stronger, but there is evidence that buying has been delayed by the users in resisting the advances. Export business has not yet been closed in any volume, one difficulty being the matter of bundling the material or otherwise packing it for tagging. Prices are still undergoing upward revision and as representing the average of brokers' views of what they will pay to local dealers and producers, we quote, per gross ton, New York, as follows:

Old girder and T rails for melting	$9.75 to $10.25
Heavy melting steel scrap	9.75 to 10.25
Relaying rails	19.00 to 19.50
Rerolling rails	9.75 to 10.25
Iron car axles (nominal)	15.25 to 15.75
Steel car axles	12.75 to 13.25
No. 1 railroad wrought	10.75 to 11.00
Wrought-iron track scrap	10.00 to 10.25
No. 1 yard wrought, long	9.75 to 10.00
No. 1 yard wrought, short	9.25 to 9.50
Light iron (nominal)	3.25 to 3.75
Cast borings	6.50 to 6.75
Wrought turnings	6.50 to 6.75
Wrought pipe	8.50 to 9.00

Quotations to consumers of cast scrap are as follows, per gross ton, New York:

Old carwheels	$9.50 to $10.00
No. 1 machinery cast	11.25 to 11.75
No. 2 heavy cast	9.75 to 10.25
Stove plate	8.25 to 8.50
Locomotive grate bars	7.50 to 8.00
Malleable cast (railroad)	7.50 to 8.00

British Market Very Firm

Welsh Strike Closes Some Plants—General Trade More Closely Controlled

(*By Cable*)

LONDON, ENGLAND, July 21, 1915.

The warrant pig-iron market is idle. The Scotch markets are closed for the holidays. Consumers are doing very little, though Scandinavia and Italy are still buying foundry iron. Freights are easier to Italy. Hematite iron is also easy as well as fuel and Rubio ore. The position in Wales is very difficult owing to the strike of the coal miners; several steel tin-plate and sheet works closed on Monday owing to the want of fuel. Stocks of pig iron in Connal's stores were 146,414 tons at the end of last week as compared with 148,988 tons two weeks previous.

The general steel trade is getting more closely under State control and merchant business is dwindling. About 10,000 tons of steel for West Australia is said to have been booked by independent American plants. Prices tend upward with semi-finished steel very firm. Large independent makers in the United States are understood to have declined further export business in billets and sheet bars at present. We quote as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 19s. ($4.62).

Cleveland pig-iron warrants, 66s. 7d. ($16.20), against 67s. 6½d. ($16.43) last week.

No. 3 Cleveland pig iron, maker's price, f.o.b. Middlesbrough, 66s. 9d. ($16.24), against 67s. 9d. ($16.48) a week ago.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £11 15s. ($57.18).

Steel ship plates, Scotch, delivered local yards, £10 ($48.66).

Steel rails, export, f.o.b. works port, £8 17s. 6d. ($43.19).

Hematite pig iron, f.o.b. Tees, 96s. ($23.36), compared with 98s. ($23.85) last week.

Sheet bars (Welsh), delivered at works in Swansea Valley, £7 10s. ($36.49).

Steel joists, 15 in., export, f.o.b. Hull or Grimsby, £10 ($48.66).

Steel bars, export, f.o.b. Clyde, £10 15s. ($52.31).

Ferromanganese, f.o.b., £20 15s. ($100.98).

Ferrosilicon 50 per cent, c.i.f., £15 5s. ($74.21).

Metal Market

NEW YORK, July 21, 1915.

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Spelter	
July	Lake	Electrolytic	Tin, New York	New York	St. Louis	New York	St. Louis
14	22.00	19.37½	37.75	5.62½	5.50	21.75	21.50
15	22.00	19.25	37.50	5.62½	5.50	21.25	21.00
16	22.00	19.12½	37.50	5.62½	5.50	21.00	20.75
17	22.00	19.00	.....	5.60	5.50	20.50	20.25
19	22.00	19.00	37.00	5.55	5.50	20.25	20.00
20	22.00	19.00	36.62½	5.55	5.50	20.25	20.00

Electrolytic copper quotations are lower and nominal. Tin has declined in a dull market. Lead is easier, with business confined to resale lots. Spelter is quiet and lower. Antimony is easier.

New York

Copper.—The market has been continuously neglected and is now in a dull, heavy state, with prices entirely nominal. High grade Lake is quoted at 22c. and slightly higher, but the very choice brands are still difficult to obtain. Less desirable brands are easily obtainable and quoted down to 19.25c. Electrolytic, offered by second hands, can be had at 19c., and there is talk of even lower quotations, but the producers continue to ask 19.50c. to 19.75c. As a matter of fact, it is very difficult to tell just where the market is, first-hands themselves differing to a considerable extent. Consumption is large in the manufacture of munitions of war, and the weakness can only be ascribed to fear that the poor aggregate of demand will not absorb the greatly increased production. The exports this month total only 6691 tons.

Tin.—The dullness of the past few days has seen little relief, although prices are getting so low that it is felt that consumers should be attracted. Spot tin was quoted yesterday at 36.62½c., and two or three small lots were sold at that figure. The foreign situation has not been healthy, but a betterment is expected with the settlement of the Welsh coal-miners strike. The situation here has amounted to stagnancy. The complications which have developed in tin since the war started have encouraged the policy of buying futures, and for the present consumers are well supplied. As for spot, the large arrivals are a weakening influence. Those of this month total 3209 tons, of which 545 tons arrived on one steamship July 19. The quantity now afloat is 5210 tons.

Lead.—Except for the buying of spot lots which have been stored in the New Jersey freight yards, the market has been extremely dull. In the West, where 5.50c. St. Louis, has been the uniform quotation, there has been nothing doing. The spot offered here has been readily taken at concession well under the quotation of the American Smelting & Refining Company—5.75c., New York. The lots ranged from carloads to 200 tons, and a good part of it was metal that consumers had bought in excess of their needs on the recent big rise. The downward tendency of the market has made buyers cautious, but advances are looked for as soon as the surplus metal is absorbed. The exports this month total 1459 tons.

Spelter.—The market has been inactive, and nominal prices have declined, until 20.25c. to 20.50c., New York, is about the range, with St. Louis ¼c. lower. Brass mill special grades are still practically unobtainable at 30c., and an odd car or two of Bertha and Horsehead have brought 40c. The exports are lighter, and this month total but 2073 tons.

Antimony.—The quotations for Chinese and Japanese grades range broadly from 35.25c. to 36.25c., duty paid, in an easy market.

Old Metals.—The market is very quiet. Dealers' selling prices are as follows, but are wholly nominal:

	Cents per lb.
Copper, heavy and crucible	17.50 to 18.00
Copper, heavy and wire	17.00 to 17.50
Copper, light and bottoms	15.00 to 15.50
Brass, heavy	12.50 to 13.00
Brass, light	9.50 to 10.00
Heavy machine composition	13.50 to 14.00
No. 1 yellow rod brass turnings	13.50 to 14.00
No. 1 red brass or composition turnings	12.00 to 12.50
Lead, heavy	5.00
Lead, tea	4.75
Zinc, scrap	14.00

St. Louis

JULY 19.—Non-ferrous metals have been quiet. Quotations show some changes but there is no great activity. Tin is quoted at 40c.; Lake copper, 20c.; electrolytic copper, 19.50c.; antimony, 42c., and lead a little stronger at 5.90c.; spelter is up to 22c. for the Missouri product. In the Joplin market there was a sharp upturn and zinc blende was quotable at the close of the week at $120 for 60 per cent, with the top settlement for premium ores at $123. Second grades sold down to $70 and closed weak. Calamine brought from $50 to $85 per ton, basis range. Lead ore was unchanged at $60 per ton. Miscellaneous scrap metals we quote as follows: Light brass, 9c.; heavy yellow brass, 10½c.; heavy red brass and light copper, 12½c.; heavy copper and copper wire, 14½c. to 15½c.; pewter, 24c.; tinfoil, 32c.; zinc, 12½c.; lead, 4½c.; tea lead, 3c.

Chicago

JULY 19.—The metal situation presents a unique opportunity for profitable resales and the variety of quotations appearing is attributable to this condition. Copper producers are holding to their prices, but concessions are general. The market generally rules lower. Resale Cookson's is now being offered as low as 45c. and sheet zinc at 22c. has been done in recent sales. Copper prices are slightly easier. We quote: Casting copper, 19c.; Lake copper, 19.50c.; tin, carloads, 38c.; small lots, 42c.; lead, 5.50c. to 5.60c.; spelter, nominally, 21c.; sheet zinc, nominally, 27c.; Cookson's antimony, 47.50c. to 50c.; other grades, 38c. to 39c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 16c.; copper bottoms, 15c.; copper clips, 15.75c.; red brass, 13c.; yellow brass, 12.75c.; lead pipe, 4.75c.; zinc, 8c.; pewter, No. 1, 23c.; tinfoil, 33c.; block tin pipe, 36c.

Iron and Industrial Stocks

NEW YORK, July 21, 1915.

The so-called munitions stocks have had the limelight and have given the stock market an air of uncertainty not to say feverishness. The railroad issues have generally held steady, with latterly some promise of growing strength in comparison with the fluctuations of some of the active industrials. Added foreign complications and labor troubles are regarded as the influences balancing the effect on security prices of betterment in business. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com.	17⅝	25⅝	Pressed St., com.	48½	51⅝
Allis-Chal., pref.	56	64½	Pressed St., pref.	99	99
Am. Can, com.	49⅞	54	Ry. St. Spg., com.	32½	34⅝
Am. Can, pref.	103	105¾	Republic, com.	29⅝	35⅝
Am. Car & Fdry., com.	54	58⅜	Republic, pref.	89¾	91⅝
Am. Car & Fdry., pref.	113	114	Rumely Co., com.	2½	2⅝
Am. Loco., com.	48	52¼	Rumely Co., pref.	6½	8
Am. Loco., pref.		95⅞	Sloss, com.	34	40
Am. Steel F'dries	38⅜	42½	Sloss, pref.	86	90
Bald. Loco., com.	68	74⅞	Pipe, com.	12¼	17
Bald. Loco., pref.	102	102½	Pipe, pref.	39	42
Beth. Steel, com.	170¼	198½	U. S. Steel, com.	60⅜	65
Beth. Steel, pref.	117	121	U. S. Steel, pref.	109⅞	111⅛
Colorado Fuel	32¾	36½	Va. I. C. & Coke	41	44⅝
General Electric.	166	168½	Westge. Elec.	99¾	105⅝
Gt. No. Ore Cert.	35½	38¾	Am. Ship, com.	30	30⅝
Int. Harv. Corp., com.		60	Chic. Pneu. Tool.	55	57
Int. Harv. Corp., pref.	96	99½	Cambria Steel	49½	52⅝
Lackaw'a Steel	46	49½	Lake Sup. Corp.	8	9⅝
Nat. Enam. & Stm., com.	16½	20	Pa. Steel, pref.	58	67
Nat. Enam. & Stm., pref.	83¼	85⅝	Warwick	9¼	9⅝
			Cruc. Steel, com.	32½	50
			Cruc. Steel, pref.	90	100
			Harb-Walk. Refrac., pref.		99
			La Belle Iron, com.		30⅝

Dividends

The American Steam Gauge & Valve Company, regular quarterly, 1¾ per cent on the preferred stock, payable Aug. 1.

The J. G. Brill Company, quarterly, 1 per cent on the preferred stock, payable Aug. 2.

The Dominion Steel Corporation, quarterly, 1½ per cent on the preferred stock, payable Aug. 2.

The Underwood Typewriter Company, quarterly, 1 per cent on the common stock, and quarterly, 1¾ per cent on the preferred stock, payable Oct. 1.

The general office of the Alleghany Ore & Iron Company will be removed from Iron Gate to Buena Vista, Va. The Iron Gate furnace was blown out some weeks ago and the Buena Vista furnace was blown in after extensive repairs, including relining, rebuilding of ore trestles and bins and the installation of the Hunt filling system. Two Southwark blowing engines and additional boilers were installed. The furnace is now running on high manganese foundry and special carwheel pig irons. It is supplied with low phosphorus, high manganese Oriskany ore from the company's principal mine located at Oriskany, Va.

The American Shipbuilding Company has been awarded the contract to cut the steamers Owego, G. F. Brownell, Binghamton and J. G. McCullough of the Erie Railroad fleet of Great Lake boats into two sections for transfer to the Atlantic Coast via the Great Lake canals.

The Heilman Machine Works, Evansville, Ind., has been sold to the People's Savings Bank of that city, for $81,196, at receiver's sale. The tools and machinery were sold to White Brothers, who had been operating the plant, for $14,000.

Judicial Decisions

ABSTRACTED BY A. L. STREET

LIABILITY OF CORPORATION FOR SLANDER.—A business corporation is not liable for slander committed by one of its employees or officers, unless it was authorized or ratified by the company, even though made in the course of the performance of the employee's or officer's duties, as where one whose duty it was to recover lost or stolen articles accused plaintiff of having stolen an article. (Michigan Supreme Court, Flaherty vs. Maxwell Motor Company, 153 Northwestern Reporter, 45.)

MACHINERY BUYER'S RIGHT TO RECOVER DAMAGES.—A buyer of a machine under warranty of its efficiency is not necessarily precluded from recovering damages resulting from its defective operation merely because he continued to use it for a short time, if attempts were continually made in the meantime to remedy the defects. (Kansas Supreme Court, George O. Richardson Machinery Company vs. Brown, 149 Pacific Reporter, 434.)

EMPLOYER'S DUTY TO WARN WORKMAN.—If an employer knows of a defective condition in appliances used in moving such heavy objects as boilers, and of the resulting dangers to employees engaged in the work, he is liable for injury to one of the employees resulting from failure either to remedy the defect or to give instructions as to how the appliances might be safely used. (New York Supreme Court, Appellate Division; Mackay vs. Mackay, 153 New York Supplement, 1030.)

OPERATION OF NEW JERSEY COMPENSATION ACT.—An award is properly made under the New Jersey Workmen's Compensation Act for injury to, or death of, an employee engaged in working in New Jersey but residing in New York. Compensation for death is to be computed with reference to decedent's wages at the time of his death, rather than his average wages. (New Jersey Court of Errors and Appeals, Davidheiser vs. Hay Foundry & Iron Works, 94 Atlantic Reporter, 309.)

DELIVERY OF CARLOAD FREIGHT ON PRIVATE TRACKS.—A railway company is not bound to deliver carload freight on a consignee's private switch track unless it has agreed to do so, and it is entitled to make a reasonable charge for the service in excess of the actual cost thereof. (Florida Supreme Court, State vs. Florida East Coast Railway Company, 68 Southern Reporter, 761.)

LIABILITY OF WAREHOUSEMEN.—One who receives goods for storage is not liable for injury to them, unless he has guaranteed their safety or unless the injury was caused by some negligence on his part. And where a storage contract is entered into without any such guaranty, the warehouseman cannot be held liable on a guaranty afterward given, or a subsequent promise to insure return of the goods, unless it appears that there was some new consideration for the guaranty or promise. (Alabama Supreme Court, Bethea-Starr Packing & Shipping Company vs. Mayben, 68 Southern Reporter, 814.)

BUYER'S RIGHT TO RESCIND PURCHASE.—The purchaser of a machine is entitled to test it fairly after delivery to determine whether it complies with the warranty under which it was sold, and may rescind the contract of purchase within a reasonable time, if the machine is not as warranted. But, in rescinding, the purchaser must return the machine in as nearly as possible the same condition as it was in when he received it. If it has been injured by misuse or alterations made without the seller's consent, the purchaser's right to cancel the purchase is lost. (Iowa Supreme Court, Four Traction Auto Company vs. Hurni, 153 Northwestern Reporter, 102.) A buyer who kept a machine and continued to use it down to the time of the trial of the seller's suit to recover the amount due on the price waived any right he may have had to rescind the contract on the ground of breach of warranty. (Michigan Supreme Court, Linderman Machine Company vs. Shaw-Walker Company, 153 Northwestern Reporter, 34.)

Republic Iron & Steel Company Additions

Chairman Topping of the Republic Iron & Steel Company, confirms the report that improvements are to be made at the company's Youngstown, Ohio, plant. These, it is stated, will increase tube works capacity about 50 per cent; open-hearth steel capacity 20 per cent and the capacity of the benzol recovery plant 100 per cent, in addition to general improvements of an economic character.

Crucible Steel Company War Contracts

The way in which Crucible Steel Company common stock had been advanced last week in a fresh outbreak of the feverish speculation in the so-called war stocks led to the giving out of a statement by H. S. Wilkinson, a director of the company and president of the Holcomb Steel Company, Syracuse, N. Y., from which the following is taken. It is the first in which an official estimate has been given of the profits of war business:

> The company is building a new ordnance plant to cost about $2,000,000 at its Atha works, Newark, N. J., and has war orders which aggregate about $15,000,000. Upon these war orders it will be possible to make $5,000,000 or $6,000,000 profit provided everything goes according to calculation. Year before last the Crucible Steel Company made a profit of almost $5,000,000. Last year the company made about $1,000,000 and was obliged to suspend its preferred dividend. This year the company will make not to exceed $2,500,000, it requiring $1,750,000 to pay its preferred dividend. There is outstanding in unpaid scrip and accumulated dividends on preferred stock $7,200,000. The company is guaranteeing $7,800,000 of bonds and in addition has $2,500,000 to $3,000,000 of bonds outstanding on its subsidiary companies.
>
> With large expenditures necessary to finish its new plants, including that in Syracuse, I can see no reason why the common stock of the company should be able to pay dividends for a good many years or be worth its present selling price. The common stock is in the hands of the public, which is evidently intending to hand it to others at the highest price at which it can be sold, and this evidently is the reason for the large mis-statements made about war order contracts.

Lackawanna Steel Company's Better Earnings

The Lackawanna Steel Company's report of earnings for the second quarter of 1915 shows a profit of $268,384, whereas in the first quarter of this year there was a deficit of $565,758. The company has also issued the following statement of income account for the first six months of 1915, with comparison with the first half of 1914. It will be seen that the deficit for the first half of this year, roundly $297,000, is nearly $500,000 less than the deficit for the first half of 1914:

	1915	1914
Income from operating after deducting all expenses incident thereto, including ordinary repairs and maintenance of plants and interest on bonds and fixed charges of subsidiaries	$1,021,958.46	$455,278.89
Proportion of earnings on investments in companies not controlled, and other annual income	124,162.02	160,903.49
Total	$1,146,120.48	$616,182.38
Deduct interest on Lackawanna Steel Co. bonds and notes	828,283.34	874,850.00
Balance	$317,837.14	$258,667.62
Less charges and appropriations: Sinking funds on bonds and exhaustion of minerals	107,160.07	82,187.61
Depreciation and accruing renewals	508,051.60	442,824.79
Profits for first half	$297,374.53	$783,680.02

The unfilled orders on June 30, 1915, were 283,979 tons as against 128,880 tons on June 30, 1914. The unfilled orders on March 31 of this year were 229,910 tons.

The Boissier Electric Company, manufacturer of electroplating and jewelers' dynamos, has removed from 478 Pearl Street to 205 West Nineteenth Street, New York City.

OBITUARY

ANDREW ALLAN, SR., founder of the firm of A. Allan & Son, 486 Greenwich Street, New York City, died July 6, at Asbury Park, N. J., aged seventy-eight years. He was born at Edinburgh, Scotland, March 10, 1837, and after serving as an apprentice in the brass foundry and finishing shops of the Laidlaw Works in that city came to this country in 1857. He was employed as a brass molder in the Mitchell Vance and Henry R. Worthington plants and in 1865 took charge of the H. F. Johnston's Brass Works, New York City. When that firm went out of existence in 1891, he founded the firm of A. Allan & Son, to manufacture Allan bearing metals. He retired from active business in 1909, but continued to act in an advisory capacity until his death. In 1876 he invented a process of alloying lead and copper in any desired proportion with or without tin. He leaves a widow, three sons, two of whom were associated with him in business, and two daughters.

WILLIAM H. WALLACE, an iron and steel merchant, died at his residence in Brooklyn, N. Y., July 20, from heart disease, aged eighty-four years. He was born in New York City in 1831 and after a common school education studied and practiced mechanical engineering. About 1852 he became associated with the Allaire Iron Works of New York. In 1856 he went into business on his own account as an iron and steel merchant and shortly afterward became the head of William H. Wallace & Co., iron merchants. He was interested in a number of local and out-of-town industrial enterprises and was a member of several clubs, being the oldest living founder of the Brooklyn Club. Two sons survive him.

JAMES W. WEAVER, secretary and treasurer Thomas Iron Company, Easton, Pa., who died July 8, had been in the service of the company forty-five years. He began as an apprentice in the machine shop at Hokendauqua, Pa., in 1867, at the age of fifteen. Later he had positions as clerk and telegraph operator at various plants and became secretary and treasurer in 1892. He was also secretary and treasurer of the various railroad subsidiaries of the Thomas Iron Company. His father was a pioneer iron manufacturer in the Lehigh Valley.

CHARLES ALVA WASHBURN, director and manager of the Union Malleable Iron Company, East Moline, Ill., died at his home in that city, July 9, aged thirty years. About six months ago he was taken ill with grippe and complications developed. He was born at Fairmount, Ill., and was graduated from the University of Illinois in 1906, when he entered the employ of Deere & Co. In 1912 he became director and manager of the Union Malleable Iron Company. He leaves a widow and one son.

GEORGE G. HELLER, president of the Heller Forge Company, East St. Louis, Ill., died July 16 after a short illness, aged fifty-two years. In addition to the presidency of the forge company he had many other large interests.

Cambria Steel Company's Export Trade

The American Steel Export Company which has been organized to handle the export trade of the Cambria Steel Company has its general offices in the Morris Building, Philadelphia, in connection with the general offices of the Cambria Company. William H. Donner is president; C. B. McElhany, first vice-president; W. S. Ottinger, second vice-president, and O. Kafka, general manager of sales. It is understood that the export company will carry on export business also in products which are not manufactured by the Cambria Steel Company.

The Erie Stove & Mfg. Company, Erie, Pa., has let contract for an additional one-story brick and steel building to cost $75,000. A. Schotte, Erie Trust Building, Erie, is the architect.

BRITISH STEEL EXPORTS

Pig-Iron Decrease 73 Per Cent for the First Half—Large Bar Shipments to France

The iron and steel exports of Great Britain continue to show a marked decrease in tonnage and in value. Total exports in June, excluding iron ore and scrap, were 268,872 gross tons against 358,138 tons for June, 1914, a decrease of about 25 per cent; in May it was 38 per cent. The decrease for the first six months was from 2,376,264 tons to 1,448,502 tons, or 38 per cent. The falling off in values was £7,397,149 or from £25,353,770 to £17,771,996. The exports of pig iron to July 1, 1915, were 126,521 tons against 455,126 tons to July 1, 1914, a decrease of nearly 73 per cent.

Steel bar exports increased in contrast with all other products except hoops and strips. For June, 1915, steel bar exports were 42,977 gross tons compared with 16,696 tons in June, 1914. France took 29,433 tons as compared with only 372 tons in June, 1914. To July 1, 1915, the total exports of steel bars were 228,552 tons compared with 110,171 tons to July 1, 1914, an increase of over 100 per cent. Of this large total France took 162,031 tons, against only 2447 tons to July 1, 1914. In hoops and strips the exports were 4992 tons in June compared with 2991 tons in June, 1914, and 22,282 tons to July 1, 1915, against 18,283 tons for the first half of 1914. Of these totals 50 per cent went to British East Indies.

In galvanized sheets the falling off for the first six months was 212,324 tons, or nearly 60 per cent, the exports to July 1, 1915, being only 167,415 tons.

Exports of ferromanganese in June, 1915, were about 12,000 gross tons compared with about 9400 tons in June, 1914. For the first half they were about 40,000 tons compared with about 56,000 tons to July 1, 1914. Imports of manganese ore in June were only 27,229 tons, against 39,248 tons in June, 1914. Manganese ore imports fell from 244,465 tons up to July 1, 1914, to 134,526 tons up to July 1, 1915, or about 45 per cent.

British imports of iron and steel, apart from iron ore and scrap in June, 1915, were 133,556 gross tons against 186,350 tons in June, 1914. To July 1, 1915, the imports were only 511,012 tons compared with 1,170,989 tons to July 1, 1914, a decrease of 659,977 tons or nearly 55 per cent.

Iron-ore imports for June were 640,648 gross tons, compared with 544,743 tons in June, 1914. To July 1, 1915, however, a slight increase in imports is shown, or from 3,060,639 tons to 3,063,515 tons. Imports of crude zinc were 5533 gross tons for June, 1915, compared with 9023 tons for June, 1914. For six months to July 1, the imports were 45,623 tons compared with 56,865 tons to July 1, 1914. The values, however, were in inverse ratio, being £1,783,884 to July 1, 1915, and £1,250,659 to July 1, 1914.

Pennsylvania Railroad's Cambria Holdings

The Pennsylvania Railroad management issued the following statement at Philadelphia this week relative to fresh reports as to the acquisition of the railroad company's holdings in the Cambria Steel Company: "It can be authoritatively stated that the Pennsylvania Railroad Company has not given an option on its Cambria Steel Company's stock to Mr. Frick, nor is there any basis for the reported consolidation of the Cambria and Pennsylvania Steel companies. When Mr. Donner became chairman of the Pennsylvania Steel Company he was given an option on a portion of the Pennsylvania company's holdings, both in the Cambria and Pennsylvania Steel companies."

The gas absorbing power of molten copper increases in general with the temperature up to a certain point, as well as with the increasing purity of the metal and the partial pressure of the gas, according to W. Stahl in *Metall und Erz*. The presence of platinum or nickel, however, is stated to have a favorable influence on the absorption.

MOTOR TRUCK EXPERIENCES

Operating Costs of Two Cincinnati Factories, in Comparison With Horse-Drawn Vehicles

Trucking in Cincinnati, Ohio, presents difficulties in grades sometimes as steep as 15 per cent, and in numerous streets paved with cobble stones. The numerous suburbs of the city, such as Cumminsville, Cheviot, Hartwell and Oakley, call for hauls ranging from 4 to 10 miles, or round trips of 8 to 20 miles. The experience there with autotrucks is, therefore, of more than passing interest.

The Cincinnati Stamping Company, like many manufacturing plants in Cincinnati, has no sidetrack facilities and is compelled to haul the raw material to its plant as well as to deliver it after it is fabricated. The following statement gives the record of one day's work with motor trucks, as compared with hauling by means of horse-drawn vehicles:

Work of One 2-Ton Truck, One Day

7 a. m. to 11 a. m., from depot, work of one double team for all day.	
11 a. m. to 2.30 p. m., trip to Westwood, Cheviot, work of double team and one single team for all day.	
3 p. m. to 7.30 p. m., trip to Prince Hill, doing the work of one single horse and wagon all day.	
Amount of gasoline, 10 gal., at $0.13	$1.30
Amount of oil, ½ gal., at $0.35	.17
	$1.47
Mileage	60 miles
Total cost of operating one 2-ton truck per day, including wages of driver and up-keep, interest, depreciation on truck, garage, etc.	$10.50
Wages of one helper	1.50
	$12.00
Total cost for double team and wagon, including wages of driver, up-keep, interest and depreciation and stable charges, at $5.22 each	$10.44
Wages of two helpers, at $1.50 each	3.00
	$13.44
Total cost for single horse and wagon as above (no helpers), $4.49	13.47
Cost, using horses	$26.91
Cost, using motor truck	12.00
Saving in favor of truck, per day	$14.91

It will be noted that this record was taken on a day when several long trips were made, with a total mileage of 60 miles. The average total, the company states, is about 30 miles a day, but the saving on short hauls is proportionately as great, when the truck can be kept busy, and this has been one important factor in the success of the company in the use of its motor trucks. Another is the employment of a competent chauffeur, or driver, who is not only able to make minor repairs but is careful enough to stop his motor when unloading the truck.

Another Cincinnati firm that has found autotruck delivery satisfactory is the V. N. Devou Supply Company, dealer in machinists' tools and supplies and heavy hardware. The subjoined table gives the record of one 1½-ton truck for the year 1914, while the one following shows the cost of two horse-drawn trucks, which the one truck has now superseded.

Operating Cost of 1½-Ton Motor Truck

Mileage, miles	6,888
Deliveries	8,188
Freight, hauled, lb.	593,052
Rent	$120.00
Insurance	97.93
Repairs	7.25
Sundries	19.23
Gasoline	139.40
Oil	15.80
One chauffeur, at $15 per week	780.00
Tire expense	160.00
	$1,239.61

Cost Per Annum of Operating Two 2-Horse Wagons

Two drivers, at $12 per week	$1,248
Feeding 4 horses, at $4 per week	832
Shoeing 4 horses, at $2 per month each	96
Repairing and painting two wagons	60
Repairing four sets of harness, at $5 each per year	20
	$2,256

The depreciation on both teams and motor trucks is generally figured at 20 per cent a year, and in the last two tables given this has not been included for the reason that the two outfits cost approximately the same. A conservatively estimated cost for two two-horse teams, with wagons, harness, etc., is $1,950, while for a 1½-ton truck it is about $2,000.

Both of the above firms use trucks manufactured by the United States Motor Truck Company, Cincinnati, and it is worthy of note that the Cincinnati Stamping Company finds its tire expense will average $170 per year, on its 2-ton trucks, while the V. N. Devou Supply Company's tire cost averages $160 on its 1½-ton truck. Both companies state that it is almost impossible to estimate the amount of money saved indirectly by being able to make quick deliveries in the winter time when the streets are too slippery for horses.

Detecting Burnt Steel

In discussing "The Detection of Burning in Steel" at the recent annual meeting of the Iron and Steel Institute in London, J. E. Stead said that Stansfield was the first to show clearly that the actual burning of steel, or heating it to such a high temperature as to render the metal incapable of being rolled or forged without breaking up, was coincident with incipient fusion. In a research on high phosphorus steel the author said he had shown that the first liquid that forms is very rich in phosphorus and that burnt steel can readily be detected when the metal has cooled down, for the phosphorized portions are then located either in globules or in envelopes around the crystals.

As a rule burnt steel reveals itself at the forge or rolls. No other test is necessary to prove burning. If, however, a steel ingot that is known to have been heated to incipient fusion be cooled undisturbed in the furnace so as to allow the liquefied part to solidify, then reheated to a proper temperature, it can be rolled without breaking up and the rolled steel will be good. This knowledge is not, however, of great practical value, for the furnacemen cannot always tell whether incipient fusion has started and only discover the fact when the metal breaks up in the mill or forge.

It is of the greatest importance, however, to detect with certainty whether steel has been burnt or is simply red short and the new cupric reagent of the author, described in another paper by him on "Iron, Carbon and Phosphorus" most clearly shows—in all steel which has broken up at the rolls or forge as a result of what is technically called burning—that the phosphorus has become segregated in minute globules in the body of and around the crystals in the form of more or less continuous envelopes.

The question is often asked of the expert, when steel samples have been broken up at the rolls, whether the material is naturally red short or has been burned. The sides of cracks found in steel, whether red short or burnt, are always lined with oxide and the expert must be careful to select portions free from cracks and to polish and etch them. If they be free from globular specks, rich in phosphorus, it may be concluded that the material has not been burned and is naturally red short, but if such specks be present the reverse conclusion will be justified.

According to the report of the Industrial Commission of Wisconsin, which will shortly be issued, 12,000 industrial accidents were reported to the commission in the fiscal year ended June 30. Of this number 93 per cent, or 11,337 cases, were settled between employer and employee. The commission had 360 cases brought before it for adjudication and twenty-four cases were carried to the courts. The cost to the State for administering the law was $13,771 and the amount paid to the workmen for accident indemnity and medical expenses was $1,350,000. The number of persons killed by industrial accidents was 200, sixty-three of whom left no dependents. Widows were left in sixty cases and in fourteen others a child was left as well as a widow. In nineteen cases a widow and two children were left. Only two representative employers have elected to remain outside of the provisions of the Workmen's Compensation Act.

PERSONAL

J. E. Ruth, who has for some time been at the home office of the Gisholt Machine Company, Madison, Wis., preparing himself for work in the sales organization of the Gisholt Periodograph department, is now located at the Gisholt New York office, 50 Church Street, and will look after Gisholt Periodograph interests in the New York and metropolitan territory.

J. T. Rothier, formerly manager of the Chicago office of Matthew Addy & Co., is now connected with the sales force of Walter-Wallingford & Co., with headquarters in Cincinnati.

Alden R. Taylor has been appointed assistant manager of the New York office of the Allied Machinery Company of America, to assist G. R. Woods, manager.

W. M. Swift Miller, formerly advertising manager of the Allis-Chalmers Company, recently purchased a heavy interest in the Sterling Metal Parts Company, Milwaukee, and now is president and general manager.

The Knox Motors Associates of Springfield, Mass., an association recently organized to act as sole distributors of the products of the Knox Motors Company, announce the appointment of C. F. Rouze as sales manager. Mr. Rouze succeeds H. F. Blanchard, who for several years past has been sales manager of the Knox Motors Company and who recently resigned that position.

In THE IRON AGE of July 15, it was stated that J. F. McNamara had been appointed general manager of the Bayonne Steel Casting Company, Bayonne, N. J., whereas the name of the company should have been the Bayonne Casting Company.

Ferdinand Schlesinger, president Northwestern Iron Company, Milwaukee, returned July 14 from a six months' trip to Europe.

Joachim G. Giaver, who has been chief engineer of structural design and foundations for D. H. Burnham & Co. for the past seventeen years, has opened offices as a consulting engineer at 751 Railway Exchange Building, Chicago.

W. Spencer Robertson has been appointed secretary of the American Locomotive Company, 30 Church Street, New York, to succeed C. B. Denny, who has resigned.

William T. Dunn, formerly tool steel expert for the Carpenter Steel Company in Boston and New England, has been appointed district sales agent for New England and Eastern Canada for the International High Speed Steel Company, 99 Nassau Street, New York City.

George B. Massey has resigned his position as manager of foreign sales with the Bucyrus Company and has formed the George B. Massey Company, with offices in the Peoples Gas Building, Chicago, to engage in consulting engineering, specializing in the selection and method of operation of excavating machinery, with special attention to the foreign field.

L. S. Love, formerly head of the L. S. Love Machinery Company, has associated himself with Sherritt & Stoer Company, Inc., dealer in machine tools, railroad and machine shop equipment, Finance Building, Philadelphia.

Isaac D. Russell, who for many years has been prominently identified with the Russell & Erwin Mfg. Company, New Britain, Conn., one of the divisions of the American Hardware Corporation, was recently made treasurer of the corporation to succeed the late Charles E. Wetmore.

John C. Haswell, vice-president of the Marion Malleable Iron Works, has been elected president of the Dayton Malleable Iron Company, Dayton, Ohio.

F. W. Hall, who went from this country to England seventeen years ago and has since been engaged in selling American tools and machinery there, for eight years being connected with the Fairbanks Company and for the past six years with Theodore Butler, Ltd., of London, is spending several weeks in the United States. His plan is to meet American manufacturers who are interested in exporting to Great Britain and the British colonies. Mr. Hall will visit New York, Philadelphia and Boston. His address up to Aug. 20 will be Welden Hotel, Greenfield, Mass.

C. B. Halladay, for many years auditor of the Advance Thresher Company and recently associated with the Rumely Company, Battle Creek, Mich., has purchased the interest of F. D. Angell in the American Column Company, Battle Creek, Mich., and has been elected treasurer and manager of the company.

G. M. Robinson, president and treasurer of the Charter Gas Engine Company, Sterling, Ill., is perhaps the oldest active player in the manufacturers' baseball league of Sterling, which he organized. He recently passed his sixtieth birthday.

E. J. Hutter, formerly with the Atlantic Gas & Electric Company, New York City, has been appointed managing engineer of the various power plants of the Hooper, Kemble & Williams Company, Boston, Mass.

W. W. McFate, who has been assistant general sales manager of the Trumbull Steel Company, Warren, Ohio, has been appointed assistant to Jonathan Warner, president of the company, and has been succeeded by Paul Wick.

Frederick H. Holt has resigned as district sales manager of the Detroit, Mich., offices of the Jones & Laughlin Steel Company, Pittsburgh, and will be succeeded by F. D. Heath, now assistant district manager of sales of the Boston, Mass., office. These changes become effective Aug. 1.

J. F. Townsend, traffic manager of the National Tube Company, Pittsburgh, has been elected president of the Traffic Club of Pittsburgh.

A. H. Zirckle, connected with the traffic department of the Pittsburgh Steel Company, Pittsburgh, has been appointed manager of the recently organized traffic department of the Pittsburgh Steel Products Company, a subsidiary of the Pittsburgh Steel Company.

Max Würfel has been appointed Eastern manager for the Huessener Engineering Company with headquarters in Philadelphia.

Engineering Societies and the Naval Advisory Board

WASHINGTON, D. C., July 20, 1915.—Secretary Daniels has announced that he has invited eight scientific societies in the United States, each to name two of their members for service on the naval advisory board of inventions, of which Thomas A. Edison is to be chairman. The eight organizations that have been asked to name members of the advisory board are the American Society of Civil Engineers, American Chemical Society, American Institute of Electrical Engineers, American Institute of Mining Engineers, American Mathematical Society, American Society of Mechanical Engineers, American Aeronautical Society and the Inventors' Guild. In soliciting their co-operation, Secretary Daniels has written to the presidents of these societies a letter in which the method of choosing their representatives on the board is referred to as follows: "I am going to ask you to take a poll by letter of your members, or in whatever way seems to you most certain of securing the men desired by the majority of your organization, to choose two of your members to serve on this board, and it will give me great pleasure when you have furnished me these names to extend the gentlemen the formal invitation of the department." W. L. C.

The Van Dorn & Dutton Company, Cleveland, has received from Italy a large order for motor gears and pinions, for an electric railway. While this is not a war order, the placing of the order with a manufacturer in this country was probably because of the war.

Pittsburgh and Nearby Districts

The Basic Products Company has announced the letting of contracts covering the erection of a large additional plant at its works at Kenova, W. Va. The company has been manufacturing dead burned dolomite for some time and had gradually increased its capacity until the output was over 50,000 tons a year. When the two kilns now to be built are operated an output of over 125,000 tons a year will be possible. The contract calls for the plant to be erected and in operation by Oct. 1. The company owns its own dolomite deposits George S. Davison is president; Albert P. Meyer, secretary, and Allen S. Davison, treasurer. Sales are handled by the Allen S. Davison Company, whose offices as well as those of the producing company are at 2514 Oliver Building, Pittsburgh.

No. 1 furnace of the Carnegie Steel Company at Bellaire, Ohio, will be blown out shortly for complete rebuilding. The new furnace will have a daily capacity of 500 tons. New stoves will also be built.

The Valley Mould & Iron Company, Sharpsville, Pa., is planning to increase considerably the capacity of its ingot mold plant.

NEW OPEN-HEARTH FURNACE FOR BRIER HILL

Owing to the heavy demand for open-hearth steel and the fact that its capacity is well sold up for some time ahead, the Brier Hill Steel Company, Youngstown, Ohio, has started to work on the building of another 85-ton open-hearth furnace, which will give it a total of eight. When the steel plant of this company was finished in the early part of 1914, it contained seven 35-ton furnaces. Since that time one furnace has been rebuilt and increased to 85 tons capacity, and another is now being rebuilt and will be of the same capacity. It is the intention of the company to make all its open-hearth furnaces of 85-ton capacity as fast as they are rebuilt. The new furnace is expected to be completed in ninety days. The concern will then have a daily capacity of 1200 to 1300 tons of open-hearth steel. Most of this will be rolled into sheet bars for use in its two sheet mills at Niles, Ohio, and the excess output will be sold in the open market in the forms of billets and sheet bars.

The court at Lisbon, Ohio, has handed down a decision in the case of the Commonwealth Trust Company of Pittsburgh, against the Leetonia Steel Company of Leetonia, Ohio, and its receiver, William H. Hepburn. This case was instituted to foreclose a $1,000,000 mortgage given by the Leetonia Steel Company to the Commonwealth Trust Company as trustee. The court held that as to all property covered by the original mortgage, the mortgage has priority over the mechanics' lien, but as to property purchased after the mortgage was given, and on which the open-hearth building was being constructed, the mechanics' lien should have priority.

Richard Jones, Jr., counsel for the Republic Iron & Steel Company, Youngstown, Ohio, states that a strong protest would be made against the slag tariffs. The method of procedure has not been determined upon. Mr. Jones represents independent furnace interests in the Mahoning and Shenango Valleys, and was one of the principal protestants against the tariffs when hearing and argument took place before the Interstate Commerce Commission at Washington.

Ella furnace of Pickands, Mather & Co. at West Middlesex, Pa., is being made ready for blast and will likely go in early in August.

The Riverside works of the National Tube Company, Wheeling, W. Va., embracing two blast furnaces, A and B, a Bessemer steel plant and tube mills, all of which have been closed down since April 30, 1914, will probably be in full operation within a month. Furnace A was started on Monday, July 19, and furnace B was expected to go in two days later. The Bessemer steel plant is a small one, containing two 5-ton vessels and will be started about Aug. 2, or as soon as some repairs can be made and a stock of pig iron accumulated. In the tube mill are five lap and two butt weld furnaces, and it will be started in part operation very soon after the Bessemer steel works get going. There is also at this works a plant of 120 Semet-Solvay by-product coke ovens, which have been in operation for some time, the coke being shipped to the blast furnaces of the National Tube Company at Lorain, Ohio. This coke will now be retained for the two blast furnaces at Wheeling. The company is now operating its blast furnaces, steel works and tube and pipe mills to about 90 per cent of capacity, its only idle plant being the works at Syracuse, N. Y.

The Youngstown Sheet & Tube Company, Youngstown, Ohio, has placed a contract with Heller Brothers of that city for the building of a new hospital to cost about $75,000. The company will award contracts this week for the erection of a new office building on land which it purchased two years ago across the Mahoning River from its works. The new building will cost about $300,000, plans for which were made two years ago by D. H. Burnham & Co., Chicago. The company will also erect a new laboratory to cost about $100,000. The company is operating its four blast furnaces, Bessemer and open-hearth steel works and finishing mills at Youngstown at nearly 100 per cent of capacity.

S. Diescher & Sons, Pittsburgh, consulting engineers for the doubling of the plant of the McKeesport Tin Plate Company, McKeesport, Pa., have let a contract to the United Engineering & Foundry Company, Pittsburgh, for twenty hot mills, 28 in. in diameter, fourteen cold mills, 26 in. in diameter, the cold mill drive and a full complement of squaring, doubling and bar shears. A contract has also been placed with the Crawford Paving Company of McKeesport for all the concrete piles in connection with the new plant. The contract for the structural steel for the new buildings, 2500 tons, was placed several weeks ago with the Jones & Laughlin Steel Company, Pittsburgh. Contracts for the rest of the equipment for this new plant will be placed within a short time.

The Turner Fricke Mfg. Company, Farmers Bank Building, Pittsburgh, will apply for a franchise for an electric light plant for the city of Marietta, Ohio, in case that city does not decide to erect a plant of its own.

The offices of the Rust Engineering Company have been removed to larger quarters in rooms 703-6 Farmers Bank Building, Pittsburgh.

The plant of the Chicago Bridge & Iron Works at Greenville, Pa., is being operated to full capacity, running night and day turns. The company has large orders for tank cars from the DuPont Powder Company and other interests.

The Greenville Steel Car Company, Greenville, Pa., is operating to nearly full capacity and has orders ahead for some time.

The Ford Motor Company, Detroit, Mich., which last year erected an assembling plant in Pittsburgh, has decided to double its capacity within the next eight or nine months. The present plant contains 268,000 sq. ft., and is five stories high. The new addition will be about the same size as the present plant and will be built on property adjoining it now owned by the company. It will be in the market for a large number of tools used for assembling the Ford cars.

It is stated that J. V. Thompson, the large coal and coke operator of Uniontown, Pa., whose affairs were placed in the hands of receivers some months ago, owns coal lands and other property valued at $65,367,758.05, according to the appraisement filed with Judge J. Q. Van Swearingen in the Fayette County courts. The appraisers were Julian Kennedy, R. C. Crawford and R. M. Hite, appointed by the court. According to the statement, Mr. Thompson owns a total coal area of 141,413.68 acres. The holdings of Mr. Thompson in Allegheny County include the Highland Building, valued at $600,000; the E. H. Jennings' property, at $300,000, in Pittsburgh, and the plant of the Allegheny Improvement Company, valued at $300.000, in Clinton. Of the most valuable securities are 1726 bonds of the Isabella Coal & Coke Company, valued at $1,208,200; 713 bonds of Pittsburgh-Westmoreland Coal Company at $641,700, and stock in the Youngstown Sheet & Tube Company, at $484,000.

Machinery Markets and News of the Works

ALL LINES ARE ACTIVE

Plants Long Idle Resume Operations

Ford Motor Company Buys $500,000 Worth of Machinery—Machine Tool Builders are Purchasers — Canadian Firms Co-Operate

From all directions comes a heavy pressure of demand for metal-working machinery, and for practically all types. With their facilities taxed to the utmost machine tools builders are adding to their plants and to their equipment, and some have rejoiced when they found an opportunity to buy a second-hand planer. Planers were among the machines for which demand developed slowly. Throughout the metal-working industry the dominant feature continues to be the general enlargement of manufacturing facilities.

New war business of great proportions continues to be reported almost daily in New York. The American Can Company, Baldwin Locomotive Works and International Steam Pump Company are stated to have taken orders running into the many millions for war munitions. Where the tools to execute further work of this character are to come from is a mystery, unless long deliveries can be arranged, and in some cases this is being done. Companies already engaged in shell work are having their troubles in finding and retaining men, and making the deliveries contracted for. Meanwhile the foreign demand for machine tools is stronger than ever.

In New England factory extensions are proceeding on a large scale, two of the more recent being new buildings for the Chase Rolling Mill Company and the Scoville Mfg. Company, both of Waterbury. The Lenox Motor Company, Hyde Park, Boston, will erect a factory at Lawrence, Mass., having 324,000 sq. ft.

Foreign inquiry is not so strong in Detroit, but the domestic market is broadening. The Lake copper industry is taking some heavy equipment. New plants are numerous in and around Detroit. Among them may be mentioned the following: Detroit Fuse & Mfg. Company, building to cost $60,000; Albion Spring & Wire Company, addition to cost $60,000, and Consolidated Truss & Tool Company, Hastings, plant to cost $150,000. Other extensions, or new plants, are planned by the Chevrolet Motor Company and the Champion Ignition Company. The Michigan Buggy Company plant at Kalamazoo, which has long been idle, has been acquired by a syndicate and will be converted into an automobile plant.

The big item in the Cleveland market is the purchase of $500,000 worth of machinery by the Ford Motor Company, much of which was placed with Detroit branches of Cleveland houses. The Warner & Swasey Company, whose turret lathes have been in tremendous demand, has bought 50 to 60 machine tools, thereby adding to recent purchases.

The demand for lathes, and portable drilling and grinding machines from both domestic sources is very good in Cincinnati.

Canadian manufacturers, under direction of David E. Thomas, representing the British Government, are co-operating for the purpose of manufacturing complete shrapnel shells. An agent of Great Britain is looking for metal-working plants in Seattle, Washington, which might undertake the manufacture of shrapnel and other war munitions.

The local trade in San Francisco is dull, except for an improvement in woodworking machinery.

New York

NEW YORK, July 21, 1915.

Reports of big deals in war munitions are so frequent and vary so greatly in detail that it is almost necessary to discuss them in a general way. The millions of dollars which are involved are almost beyond belief. All of the talk is in millions. High officials of the companies involved are in most cases averse to talking of the reports, and consequently information cannot always be had at first hand. But the gigantic demand for machinery, and the new plants which are projected or building are a verification of the big things which are being done. Two great problems confront those having to do with war business—getting the vast number of machine tools required and getting sufficient labor. An eastern Pennsylvania firm which is making shells complains that many of its men, as soon as they become proficient, are taken by other companies. Higher wages and attractive hours and conditions are the lure which wins the men. The latter are in a position where they pick the kind of machine they like to operate.

Among the reports of the week is one that the American Can Company, previously referred to in THE IRON AGE, had closed a $40,000,000 contract. It is said that the company is negotiating for the purchase of a plant in the West. It is understood in machinery trade circles that the company will concentrate on the manufacture of the brass shells which contain the explosive which propels the steel shrapnel shell from the gun. This kind of work would be somewhat in line with the company's regular line of production. The International Steam Pump Company is reported to have taken a $13,000,000 order. It has been in the market for machine tools, but it cannot be learned that any large orders for tools have been placed. The company recently secured a meter contract from the United States Government and did some purchasing on this account.

The Baldwin Locomotive Works are widely reported to have booked an $80,000,000 order from Russia for shells. The plan of the company, as reported through financial sources, provides for the organization of a separate corporation under the laws of the State of Delaware to handle the contract.

The machine tool builders have reached a point where they are saturated with orders and some of them are not making the deliveries which were specified. An exporting house complains that some of the builders are falling down badly, and are now months behind in supplying machines, the sale of which had already been made abroad. The future supply of machine tools for purely domestic use is so dubious that large dealers have tried to place contracts, entirely on speculation, for upwards of 100 of some types of machines, but without success. Second-hand machinery is scarcer than ever and, to their surprise, some of the manufacturers of machine tools are now glad to buy these machines to increase their own facilities.

By far the greater part of the inquiry coming out hinges on war business, yet there is considerable appearing also from other directions. The New York Central Railroad is in the market for a few tools, and the Morrow Mfg. Company, Elmira, N. Y., is contemplating the purchase of more equipment. Foreign governments are even more active than

y have been in their quest for machine tools. One stern machine tool company has contracted to make deries as far ahead as September, 1916.

The MotoKart Mfg. Company, Marbridge Building, New rk City, has been incorporated with a capital stock of 0,000, to continue the business of the MotoKart Company, d has acquired all patents, materials, etc., of the latter mpany. It will take title to a manufacturing site at anton, Pa., and will erect a factory containing 200,000 sq. of floor space. Plans call for the erection of three buildgs.; two, 60 x 300 ft., one, 60 x 260 ft., each three stories, power plant, 40 x 80 ft., and a three-story storage and ve building, 60 x 250 ft. The first building will be the neral machine shop. Pending the completion of the plant, is negotiating contracts for the delivery of parts which it ll assemble at the rate of five or ten cars a day. A. R. rmully is president and general manager; and H. E. Steinck, chief engineer.

Desnoyers Freres, makers of seamless tubes, 116 Boulevrde Richard Lenoir, Paris (XI), France, is in the market r a steam boiler with superheater, economizer and mehanical stoker to supply a 750-kw. steam turbine at a pres re of 225 lb. per sq. in., and desires catalogs.

The Savage Arms Company, Utica, N. Y., has let contract for the construction of a one-story boiler house, 50 x 0 ft.

The Bland Adjustable Display Frame Company, 110 South urch Street, Schenectady, N. Y., is purchasing machinery r the manufacture of bed springs, which it plans to begin thin about three weeks. It will build an addition, 50 x 60 , to be later enlarged to 50 x 100 ft. It also manufactures achine guards for the protection of operators. Philip G. orwitz is president and William Kraus, secretary and reasurer.

It is reported that Owen A. Rogers, Bloomfield, N. J., rmerly with Thomas A. Edison, has had plans prepared for brick and concrete factory, 40 x 70 ft., to be equipped as die-cutting plant.

The Department of Docks and Ferries, New York, N. Y., as awarded contract for the construction of three piers in rooklyn to cost about $620,000. Henry Steers, Inc., W. P. eaver, Inc., and George B. Spearin are the contractors.

The H. B. Chalmers Company, manufacturer of paint and arnish removers, Schenectady, N. Y., plans to rent a facry being erected by Chalcone, Inc., at Babylon, Long Island, . Y. H. B. Chalmers is president.

The American Gypsum Company, Rochester, N. Y., sufered the loss of its plant by fire on June 28 with a loss of bout $25,000. It will commence reconstruction of the buildngs shortly. S. E. Sill is manager.

The Seneca Falls Mfg. Company, Seneca Falls, N. Y., hose present plant was taken over by the State of New ork for Barge Canal construction, is having engineers draw lans for a new factory which it will erect in Seneca Falls on site already acquired. It plans to start construction work t an early date.

The Cott-a-lap Company, Somerville, N. J., manufacturer f wall fabrics, has secured a site at Bound Brook Junction or the erection of a new plant to take care of its increasing usiness.

The Leavery Heating & Ventilating Company, Syracuse, . Y., has been incorporated with a capital stock of $25,000 o manufacture steam and hot water heating supplies, etc. A. A., F. and E. V. Leavery are the incorporators.

The Simplex Rubber Company of America, Ossining, N. Y., has been incorporated with a capitalization of $300,000 to manufacture rubber goods, etc. N. A. Campbell, 31 Pine Street, New York; A. E. Travis, 71 Broadway, New York, and E. G. Evans, Tarrytown, N. Y., are the directors.

The Bossert Mfg. Company, Utica, N. Y., has let contract for two-story and basement addition to its plant, 34 x 90 ft., for a nickel-plating and polishing department.

The Clover Leaf Milling Company, Buffalo, has let contract to the Eastern Concrete Steel Company, Buffalo, for the erection of a mill and elevator, 34 x 128 ft., 160 ft. high, to cost $100,000.

Lewiston, N. Y., has voted bonds to the amount of $39,000 for the construction of a waterworks system.

The Perkins Foundry Company, Amsterdam, N. Y., has been incorporated with a capital stock of $20,000 by D. B. Perkins, W. E. and E. Walker, to manufacture special hardware, engines and boilers.

Manganese, Inc., Binghamton, N. Y., has been incorporated with a capitalization of $100,000 by A. M. Thomson, Binghamton; E. C. Richards and R. L. Ernne, Utica, N. Y., to mine and manufacture manganese and its products.

Peter J. Callan, 13 North Pearl Street, Albany, N. Y., is taking bids for a four-story factory, 35 x 70 ft., to be erected at once.

The Pillsbury Flour Mills Company, Minneapolis, Minn., has purchased an extensive tract of land at Buffalo, N. Y., and will build a plant, including elevators, flour mills, etc.

The Fleischmann Company, 701 Washington Street, New York City, will build a refrigerating building, garage and office at Syracuse, N. Y., 61 x 122 ft., one story, to cost $20,000. Robert Embleton is manager.

The Archer-Daniels Linseed Company, Minneapolis, Minn., has purchased four acres on the Buffalo River, Buffalo, N. Y., and will erect an elevator and crusher plant for the manufacture of linseed oil.

The Danahy Packing Company, Buffalo, has let general contract to the Lackawanna Bridge Company for a cooling building addition to its plant, to cost $25,000.

The Adirondack Garage Company, Hudson Falls, N. Y., has been incorporated with a capital stock of $50,000 to manufacture automobiles, etc. F. C. Sherman, E. V. Bulow and G. N. Nay are the incorporators.

The Gryphon Rubber & Tire Corporation, Mount Vernon, N. Y., has been incorporated with a capital stock of $600,000 to manufacture automobile tires, etc. The incorporators are S. A. Cunningham, 2 Wall Street, New York; P. S. Jones, 5 Nassau Street, New York City, and L. Emdin, Deal, N. J.

The Ideal Cut Glass Company, Canastota, N. Y., has let contract for a small manufacturing plant.

New England

BOSTON, MASS., July 19, 1915.

The Heppenstall Forge Company, Bridgeport, Conn., has been granted a permit for an addition to its steel forge shop on Howard Avenue.

The Remington Arms-Union Metallic Cartridge Company, Bridgeport, Conn., will build two factories, five stories, of brick and steel, to cost about $400,000. The buildings are to be duplicates of those recently started.

Further additions to the plant of the Winchester Repeating Arms Company, New Haven, Conn., include a brick addition to the office building, 16 x 139 ft., one and two stories, to cost $11,500, to be erected by Westinghouse-Church-Kerr Company. A brick addition will be made to the hydraulic plant, 21 x 305 ft., to cost about $12,000.

Robert H. Ingersoll & Bro., 315 Fourth Avenue, New York City, manufacturer of watches, who some months ago acquired the plant of the New England Watch Company, at Waterbury, Conn., has a force of fifty skilled mechanics at the plant installing new machinery and remodeling the present equipment. It is preparing machines at its plant at Trenton, N. J., for the Waterbury factory. The enamel dial, mainspring, and the die, tool and machine departments are now in operation. An output of 100,000 watches a year is planned.

The Forsyth Dyeing Works, New Haven, Conn., is building an addition, 150 x 168 ft., one story. The plant is operating 24 hr. a day.

The Thames Dyeing & Bleaching Company, Waterford, Conn., whose plant was burned recently, has increased its capital stock from $30,000 to $100,000.

The Chase Rolling Mill Company, manufacturer of printer's brass, etc., Waterbury, Conn., will build an additional 60 x 200 ft., of brick and steel, to their plant on Thomaston Avenue.

The Harris Wire Mfg. Company, Southport, Conn., which started about a year ago in a loft of one of the buildings of the C. O. Jeliffe Company, which financed the former at its start, and has recently been occuping a three-story building, has ordered more machinery and is said to be looking around for larger orders. It is now working day and night on double shifts.

The Manufacturers Foundry Company, Waterbury, Conn., is awarding contracts for the construction of a one-story brick addition to its foundry, 30 ft. square. Wilfred E. Griggs is the architect.

The Scoville Mfg. Company, Waterbury, Conn., has had plans completed for a five-story addition to its plant at East Main Street and Hamilton Avenue. It has recently purchased two tracts of land across the Mad River from its present plant. The Turner Construction Company, 11 Broadway, New York City, is the contractor for the new addition.

The Sterling Blower Company, Hartford, Conn., which has been located in the west armory building of the Colt's Patent Fire Arms Company which has been taken over by the owner to provide extra manufacturing space, has purchased the former Hartford Foundry Corporation plant. The purchase includes a lot, 150 x 550 ft., and a one-story foundry, 60 x 300 ft., with a two-story, 60-ft. ell. About $15,000 will be spent in renovating and adapting the plant.

The Norton Company, Worcester, Mass., manufacturer of

grinding machinery, has awarded contract for the construction of a pumphouse, one story, 16 x 18 ft., of brick and cement, at its Greendale plant. The E. J. Cross Company is the contractor.

The J. R. Torrey Razor Company, 128 Chandler Street, Worcester, Mass., will build a brick blacksmith shop, 19 x 28 ft., to cost about $1500.

The Burgess Company & Curtiss, Marblehead, Mass., manufacturers of aeroplanes, have plans for an addition to their plant. Details are not available.

The A. B. F. Machinery Company, Lynn, Mass., has been incorporated with a capital stock of $25,000 by Lawrence Anderson, 21 Warren Street, Lynn, Mass.; William S. Fletcher, Essex Junction, Vt., and Roy H. Booth, Brookline, Mass. It will manufacture machinery and implements used in the bowling and billiard business.

The Lenox Motor Company, Hyde Park, Boston, Mass., will locate its business in Lawrence, where it has purchased property containing 200,000 sq. ft. along the Boston & Maine Railroad tracks. Plans provide for an increase of $400,000 to its capital stock and the construction of a steel and concrete factory with about 324,000 sq. ft. of floor space. Harry L. Gilman and William A. Ames, 8 Congress Street, Boston, are preparing plans. The company plans to place orders with machine shops in Lawrence for some of its parts. It will employ about 800 men in its own plant. Daniel N. Howard is president, and W. L. Allyn, of the Briggs & Allyn Mfg. Company, Lawrence, is one of the stockholders.

Baltimore

BALTIMORE, MD., July 19, 1915.

Baltimore seems to be securing more orders for war materials now than at any time since the outbreak of hostilities, and it is believed that several of the local manufacturers will have to increase their facilities before long.

The Poole Engineering & Machine Company, Woodberry, Md., which recently secured a large shrapnel jacket contract, has been equipped to make cannon parts. The firm has closed another shrapnel case contract. S. Proctor Brady is president.

Spencer Heath, president of the American Propeller Company, 249 East Hamburg Street, Baltimore, manufacturer of aeroplane and dirigible balloon propellers, states that the works may have to be enlarged because of an increase in orders. The plant was recently rearranged so more work could be turned out.

P. Kennedy's Foundry, Charles and Wells Streets, Baltimore, is working on an order for the metal parts of 400 motor trucks for the warring nations. Joseph P. Kennedy says the trucks are to be assembled in Philadelphia. He states he is having trouble securing sufficient skilled labor. This company recently completed an order for 100,000 pairs of stirrups for the Allies.

Improvements to cost about $15,000 are to be made by the Baltimore Drydocks & Shipbuilding Company, Baltimore. Thomas H. Bowles is president.

The H. B. Davis Company, paint manufacturer, 408 Keyser Building, Baltimore, will install machinery to increase the daily capacity from 3000 to 5000 gal. It recently purchased the building formerly used by the Chesapeake Iron Works, Bayard and Bush Streets, Baltimore.

Prices on automatic stokers, water-tube boilers, pumps, motors, etc., are being sought by Riggs, Distler & Stringer, 23 Light Street, Baltimore.

A part of the cold storage plant of the Kingan Provision Company, 350 and 352 North Holliday Street, Baltimore, will be remodeled and it is planned to construct an additional building. C. M. Anderson, architect, 324 North Charles Street, Baltimore, is preparing plans.

James R. Edmunds, architect, 12 East Read Street, Baltimore, is preparing plans for two one-story factory buildings, 43 x 52 ft., for the C. C. Smith Company, varnish manufacturer.

Four new buildings are being erected at Cumberland, Md., by the Standard Oil Company at a cost of about $45,000.

The Eastern Shore Gas & Electric Company and the Federalsburg Electric Light Company, Federalsburg, Md., have merged and will control the plants at Laurel, Salisbury, Cambridge and Georgetown. The new company is controlled by Day & Zimmerman, Philadelphia.

Prices and data on can-making machinery are being sought by O. Sadler, Crisfield, Md., who plans to establish a plant for the manufacture of cans.

The Fairfield Electric Light & Power Company, Highland Springs, Va., has been incorporated with a capital stock of $5,000. G. T. Collins is president.

Machinery for the manufacture of fertilizer is to be installed by the Gauthier Abattoir Company, Bristol, Va.

With capital stock of $15,000 the Virginia Electric Welding Company, Norfolk, Va., has been incorporated. The officers are: J. A. Ridgewell, president; F. Tonnemacher, vice-president; William Benseler, secretary and treasurer.

The Duplex Brush Works, Hagerstown, Md., have been incorporated with a capital stock of $10,000 by Luther E. Harris, Samuel M. and Frank G. Wagaman, J. Vincent Jamison, Jr., Gorman S. Bussard and Levin Stonebraker, Negley Building, Hagerstown.

The Auto Outing Company, 21 East North Avenue, Baltimore, has taken over a garage at Lovegrove Street and Adams Alley. It is planned to improve it and use it as a machine shop and garage.

The Ameri-Can Sealing & Mfg. Company, Baltimore, Md., has been incorporated with capital stock of $250,000 and plans the construction of a plant in the southern section of the city for the manufacture of can-sealing machinery. The officers are: President, George W. Ruggles; secretary, Henry L. Rose, 606 Water Street, Baltimore; treasurer, Paul J. Prodoehl, 701 Calvert Building, Baltimore. The directors are these officers and Joseph M. Frederick, C. E. Stubbs and Kemp Hoen.

Philadelphia

PHILADELPHIA, PA., July 19, 1915.

The Harrisburg Pipe & Pipe Bending Company is installing additional machinery for the manufacture of shrapnel. It is advertising for tool makers to make special tools for equipping 21-in. lathes and also 200 lathe operators. It recently placed in operation its new shrapnel factory and is now busy on orders for shrapnel and seamless gas tanks.

Although the new projectile plant of the Bethlehem Steel Company at New Castle, Del., has only just started operations, it already is being enlarged. The original contract called for nine buildings, but another, three times as large as the first mill for loading shrapnel, is now under way and is being rushed forward with all dispatch. It is said the plant will be enlarged to several times the present size.

The Morton Truck & Tractor Company, Harrisburg, has completed thirty heavy tractors for the Russian Government.

The Schuylkill Haven Pipe Foundry, owned by the W. R. Dunlap Company, Reading, Pa., was burned July 13 with a loss estimated at $40,000.

The Quaker City Iron Works, Tioga and Edgemont Streets, Philadelphia, have taken out a permit for the construction of a one-story iron frame addition to their boiler shop, 25 x 146 ft., to cost about $5000.

The Schuylkill Forgings & Steel Company, Third and Luzerne Streets, Philadelphia, has purchased the brick factory at American and Price Streets, occupying a lot 202 x 270 ft.

Ocean City, Md., will receive bids until July 26 for the construction of a sewage pumping station, etc. J. M. Munford is secretary of the council.

Woodbury, N. J., will receive bids until 8 p. m., July 27, for making additions to the pumping station, furnishing boilers and pumping machinery. Arthur Starr is city clerk.

George H. Grove, 213 Walnut Street, Harrisburg, Pa., has drawn plans of a powerhouse for W. T. Bradley, Swatara Station, Pa., one story, 30 x 60 ft., of frame construction, to cost about $3000. The owner will sublet all contracts.

The New Process Steel Company, Lancaster, Pa., is building two one-story brick factory buildings, 40 x 98 ft., and 40 x 110 ft., respectively, to cost about $6000, from plans drawn by M. R. Evans, Lancaster, Pa. The contract has been let to Herman Wohlson, Lancaster.

The Lansdale Foundry Company, Lansdale, Pa., has started the erection of an addition to its foundry at North Lansdale.

Harrison Brothers & Co., Inc., Thirty-fifth Street and Gray's Ferry Road, Philadelphia, Pa., paint and chemical manufacturer, lost one of its color mills by fire recently with a loss estimated at $70,000. No plans have as yet been made for its reconstruction; but the company has had plans prepared by Wadleigh & Osbourn, Real Estate Trust Building, Philadelphia, for a previously planned addition, 100 x 150 ft., one story, of brick and concrete, for which the architects are taking sub-bids. It has awarded contract to H. E. Baton, Tenth and Sansom Streets, for the construction of a four-story brick and stone building, 60 x 125 ft.

It is reported that the plant of the Sligo Iron & Steel Company, Connellsville, Pa., may be converted into a factory for war munitions.

Indianapolis

INDIANAPOLIS, IND., July 19, 1915.

The Graphite-Metals Products Company, Indianapolis, has been incorporated with $200,000 capital stock to manufacture machinery. The directors are Frank O. Fitton, W. A. Bristor and A. H. Schlaegel.

The Davis Duplex Moving Picture Machine Company has been incorporated by H. E. Petty, John McFeeley and O. P. M. Davis, with $25,000 capital stock to manufacture moving picture machines.

The Wilson Window Guard Company, Indianapolis, has changed its name to the Diamond Wire & Iron Works.

The Kokomo Spring Company, Kokomo, Ind., has been incorporated with a capital stock of $40,000 and will manufacture coil springs and wire shapes.

George B. Kuns, receiver for the James & Meyer Buggy Company, Lawrenceburg, Ind., has received a rush order for 2000 road carts for South America. The carts are of special make, to suit conditions in that continent.

The school board, Columbus, Ind., is about to sell $40,000 in bonds for the construction of a vocational school.

The W. B. Brown Company, Bluffton, Ind., has been incorporated with $50,000 capital stock to manufacture chandeliers, fixtures, etc. After a shut-down of a month, the company has been reorganized, the officers of the new company being: President, W. B. Brown; vice-president, Henry C. Arnold; secretary, Cairo Snyder; treasurer, W. R. Barr.

The Crown Oil & Gas Works, Shelbyville, Ind., have been incorporated with a capitalization of $15,000 to sink and operate oil and gas wells. The directors are W. H. Berkley, W. B. Berkley and R. G. Newell.

Meade, Johnson & Co., 306 Bergen Avenue, Jersey City, N. J., manufacturer of chemicals, will move its plant to Evansville, Ind., where it will occupy vacant mill buildings.

The North Vernon Lumber Company, North Vernon, Ind., manufacturer of lawn swings, will enlarge its plant and substitute electric for steam power. The addition is to be 40 by 50 ft., two stories.

The Letz Mfg. Company, Crown Point, Ind., manufacturer of grinders, reports orders enough to keep at capacity many months.

The American Playground Device & Swing Company, Anderson, Ind., has changed its name to the American Playground Device Company.

Schmitt, Berendes & Schmitt, Evansville, Ind., will build a garage and will purchase a freight elevator and machine tools.

The First Avenue Brick & Tile Company, Evansville, Ind., is in the market for $20,000 worth of additional equipment.

Chicago

CHICAGO, ILL., July 19, 1915.

Plant extensions are being made in unusual number and the wide variety of operations which seem to be expanding would indicate a good growth of domestic manufactures in addition to the special provisions which are being made to handle war orders. These increases of capacity are coincident with a number of inquiries for new tools, and sales in this market are well sustained. Among the new plants are a number of foundries and a substantial demand is expected for equipment for this purpose. A number of orders for overhead cranes are reported. Manufacturers of power presses find an improvement in their business in the last several weeks.

The LaGaucear-Rowe Engine Company, Chicago, has been incorporated with a capital stock of $8,400 by Charles A. Rowe, Evanston, Ill., Jacques LaGaucear and Harry H. Armstrong.

The K. & G. Machinery Company, Chicago, has been incorporated by Wynant V. Gush, Frank A. Mombleu and Henry Kreutzman, 3321 Vernon Avenue, with a capital stock of $10,000.

The McKenzie Steel Fence Post Company, Chicago, has been incorporated by Henry Rawstrom, Benjamin F. Ninde and Will H. Potter, with a capital stock of $15,000. It can be reached in care of Benjamin F. Ninde, 112 West Adams Street.

The Universal Valve Company, Chicago, has been incorporated with a capital stock of $50,000 by Jacob B. Knudson, Ray Densmore, 6444 Ellis Avenue, and Frank Ory.

The N. H. Van Sicklen Speedometer Company, Aurora, Ill., has outgrown its present plant and is now planning the erection of a plant to have 100,000 sq. ft. of floor space.

The Byrd High Compression Ring Company, Rockford, Ill., is installing machinery in a new factory building containing 30,000 sq. ft. floor space, erected to provide for its increased business.

The Schalker Packing Company, Leavenworth, Kan., has been incorporated with a capital stock of $50,000. It will start the construction of a plant at Third and Choctaw Streets, for cold storage purposes. W. A. Seymour is general manager.

Robinson, Kan., has voted bonds for $10,000 for an electric light and power plant.

The Nebraska State Board of Control, Lincoln, Neb., is advertising for bids for improvements to the power plant at the State Penitentiary, to cost about $40,000.

J. G. Cherry, Cedar Rapids, Iowa, has purchased the strawboard mill at Tama, and will remodel it and put in new equipment. Three 300-hp. boilers will be installed and $75,000 will be spent this year on reconstruction work.

The City Council, St. Paul, Minn., has received a petition from the Willys-Overland Automobile Company, Toledo, Ohio, for vacating streets running off of University Avenue, adjoining the Illinois Steel Company plant. The site comprises about eighteen acres and has a frontage of 500 ft. on University Avenue. It is reported that work will start within about a month after the petition shall be granted on the erection of a branch automobile assembling and service plant, to cost about $250,000.

Lakefield, Minn., will receive bids until July 28 for furnishing and constructing improvements to waterworks and electric light plant. E. C. Anderson is village recorder.

Sioux Falls, S. D., will receive bids until July 26 for four aternative installations of pumping machinery. Walter C. Leyse is city auditor.

The Consumers Power Company, Minot, N. D., is planning additions to its plant, to cost $75,000, and will install additional boilers, engines and machinery.

The Van Dorn & Dutton Company, Cleveland, has opened a branch office in the Ideal Building, Denver, Col., to take care of the trade in that section. O. H. Davidson will be in charge. The office has been established in the interest of the company's gears and pinions for electric railway and mill and mine motors. It will also handle the company's mill gearing.

The Great Western Plate Glass Company, Laramie, Wyo., will erect a factory estimated to cost about $1,250,000. The company will not take up the matter of building until about Oct. 1. A. C. Bailey, 608 State Bank Building, Omaha, Neb., should be addressed.

Milwaukee

MILWAUKEE, WIS., July 19, 1915.

Not in many months has such a sound indication of a revival in business appeared in nearly every line of the metal trades as since July 1. Shops that have been idle or moving with difficulty are being manned once more. Active operators are extending schedules and increasing pay-rolls. Whereas the improvement in business up to the end of the first half year affected only a few lines, such as machine tools, automobile parts and similar specialized lines, the present revival embraces heavy machinery, notably pumping engines, ice and refrigerating equipment, and castings. The Allis-Chalmers Mfg. Company is working overtime in many departments; the Vilter Mfg. Company is on a 24-hr. schedule; the Bay View mills of the Illinois Steel Company have increased operations to 75 per cent. of normal, an increase of 15 per cent in three months. Against this must be put the continued dullness in the structural iron field. Contracts formerly considered small bring out a wild scramble and prices ofttimes are at cost. Generally speaking, confidence is displayed everywhere.

The J. I. Case Threshing Machine Company, Racine, Wis., which purchased the business of the Perfection Road Machinery Company, Galion, Ohio, as reported, will move the works to Racine at once. It has been exclusive sales agent for the road machinery for several years, and the reason for absorbing it is to largely extend the production, which is easily possible at the Case works in Racine. The purchase gives the company a complete line of road construction and maintenance equipment, it having previously built only the heavier types.

The Overland Shoe Company, Racine, Wis., is the incorporation of the business established two years ago by Alvin, Max and Louis Wolff at Racine. The product is workmen's shoes with aluminum soles. The new plant will consist of two buildings, a main shop and office, 30 x 40 ft., two stories, and an aluminum foundry, one story, 28 x 40 ft.

The F. H. Gruetzmacher Auto Company, Shawano, Wis., will build a garage and small machine shop, to contain an oxy-acetylene welding and cutting plant.

The Milwaukee Heating Company, Milwaukee, has been incorporated with $10,000 capital stock by W. F. Mayer, A. M. Aldrich and Lynn S. Pease.

The Federal Malleable Company, 299-323 Sixty-fourth Avenue, West Allis, Milwaukee, is rushing work on its addition so that the tension on its present facilities may be relieved. The shops are working part overtime and still cannot fill the specifications. It is expected the new shop will be ready by Aug. 15.

The Badger-Packard Machinery Company, 76 West Water Street, Milwaukee, has increased its capital stock from $50,000 to $75,000. The company formerly was known as the O. L. Packard Machinery Company and recently absorbed the H. P. Yale Company. Previously it consolidated with the Badger Machinery Company and is occupying the former quarters of this company.

The Babcock Automobile Spring Company, Milwaukee, has taken possession of its new plant at 192-194 Milwaukee Street. The business is devoted exclusively to replacement of automobile springs and expert repairing, which includes re-arching and re-tempering. The plant is equipped with gas tempering furnace, oil bath, fitting racks, etc.

The T. S. Wheel & Mfg. Company, 245 Oregon Street, Milwaukee, maker of steel ball-bearing wheels for automobiles and trucks, stampings and metal specialties, has changed its corporate style to Sterling Metal Parts Company. W. M. Swift Miller is president and general manager.

The Aluminum Goods Mfg. Company, Two Rivers, Wis., is installing a 500-hp. Nordberg unit to replace an engine damaged two weeks ago. The new engine is direct-connected to the rolls instead of being operated through gears and belts. A large roll was also wrecked and required replacement. It was built two years ago and even with the added facilities the company has been unable for several months to cope with its rolled material requirements. The accident interfered seriously with the production; but provision is made in the replacements to largely increase the former output.

The Falls Machine Company, Sheboygan, Wis., will build a one-story reinforced concrete shop, 45 x 154 ft. A. C. Clas, architect, Colby-Abbott Building, Milwaukee, is receiving bids.

The O. H. Bossert Company, Milwaukee, is taking bids on various materials for the new $250,000 Ford Motor Company branch plant at Milwaukee, for which it has been awarded the general contract.

W. G. Kirchoffer, Madison, Wis., is preparing plans for a waterworks plant for the town of Wittenberg, Wis., to cost $12,000.

Cleveland

CLEVELAND, OHIO, July 19, 1915.

The Ford Motor Company, Detroit, Mich., has been a heavy buyer of machine tools the past few days, its purchases amounting to about $500,000. Of this business $400,000 or more was placed with Detroit branches of Cleveland machinery houses. The Warner & Swasey Company, Cleveland, last week placed orders for 50 to 60 machine tools, including lathes, planers, gear-cutters, grinders and drilling machines. This was supplemental to a large purchase of machinery made by this company a few months ago. Among new inquiries that have come out is one for a number of large cranes for an Australian steel plant. In general the market continues very active, the heaviest demand being for lathes and automatic screw machines. Little of the present business in this territory is for shell-making machinery. Considerable inquiry, however, continues to come from other sections for machines for that purpose. Among new orders placed with a Cleveland builder is one for 50 automatic screw machines for work not associated with the making of war material. Owing to the recent heavy demand, planers have been added to the list of machine tools on which prompt deliveries can no longer be secured. The demand for locomotive cranes for export continues heavy and the Brown Hoisting Machinery Company, Cleveland, which previously took a Russian order for 16 machines, has booked an additional order for 22 machines to go to Russia. The demand for gas engines is very good. Transmission equipment is in heavy demand.

The Chandler Motor Car Company, Cleveland, will enlarge its plant by the erection of a one-story steel and concrete building, 120 x 400 ft., a one-story concrete building, 60 x 200 ft., designed to permit the addition of three more stories, a boiler house, 40 x 60 ft., and the addition of a second story to the office building, 40 x 120 ft. Two 15-hp. return-tube boilers for heating purposes will be required for the boiler house. Plans are being prepared by Ernest McGeorge, engineer, Leader-News Building, Cleveland.

The Vlechek Tool Company, Cleveland, will erect a three-story brick and steel addition to its plant at a cost of $12,000. The first floor will be used for a shipping room, the second for a machine shop and the third for storage.

The Simmons Metal Construction Company, Cleveland, has been incorporated with a capital stock of $25,000 by E. H. Tilden, Horatio Ford and others.

The Giant Cable Hoist Company, Cleveland, has been incorporated with a capital stock of $20,000 by John S. Clarke, B. D. Williams and others.

Bids will be received by the commissioner of purchases and supplies, Cleveland, July 28, for water-tube boilers for the Division Avenue pumping station, and on July 30 for transformers for the municipal electric light department.

The Falls Rubber Company, Cuyahoga Falls, Ohio, will erect a powerhouse, plans for which have been prepared by Ernest McGeorge, engineer, Leader-News Building, Cleveland. Steam will be provided for heating and vulcanizing purposes. Two 150-hp. high-pressure water-tube boilers for heating will be required, as well as vacuum pumps, etc.

The B. F. Goodrich Company, Akron, Ohio, has placed a contract with the Carmichael Construction Company, Akron, for a six-story factory 100 x 360 ft. with a 120-ft. ell.

The Mohawk Rubber Company, Akron, Ohio, has commenced the erection of an addition that will double the capacity of its plant.

The Gartland Brothers, Marion, Ind., have acquired a site on Starr Avenue, Toledo, on which they will erect a gray-iron foundry. A one-story brick and steel building, 100 x 430 ft., will be erected. The plant will be operated under the name of the Gartland Foundry Company. M. F. Gartland, Marion, will be president, and Thomas Gartland, now manager of the Gartland Brothers' plant at Kokomo, Ind., will be manager.

The Standard Steel Tube Company, Toledo, Ohio, is enlarging its plant by the erection of a one-story brick and steel addition, 110 x 120 ft. The company's product goes largely to the automobile trade.

The Galion Iron Works & Mfg. Company, Galion, Ohio, will enlarge its plant by the erection of an extension to its foundry 60 x 64 ft.

The Fostoria Screw Company, which was recently organized as a consolidation of the H. & M. Screw Company, Fostoria, and the Rummel Machine Screw Company, Cleveland, has completed its organization by the election of the following officers: M. M. Carr, president; Philip Apfel, vice president; E. R. Pillars, secretary-treasurer and general manager.

The Warren Motor Truck Company, Warren, Ohio, recently incorporated with a capital stock of $25,000, has taken over the equipment of the Standard Motor Truck Company, Warren, and will occupy the plant used by the defunct Standard Company. R. B. Wick is president and L. L. Jones secretary.

The Greentown Aluminum Company, Greentown, Ohio, has been incorporated with a capital stock of $25,000 to manufacture aluminum cooking utensils. A. C. Myers, R. P. Hoover, and others, are among the incorporators.

The Herbrand Company, Fremont, Ohio, will erect an addition to its plant to cost $20,000. The company has recently received some large orders for automobile forgings which necessitated an increase in its capacity.

The Defiance Machine Works, Defiance, Ohio, has put its plant on double shift owing to the large volume of work on hand.

The Ohio Cast Stone Company, Painesville, Ohio, will build a plant consisting of a main building 40 x 200 ft., and a wing for dry kilns, 60 x 100 ft. The company will manufacture stone blocks under a patented process.

The plant of the American Electric Clock Company, Ashland, Ohio, will shortly move to Canton, Ohio, and will occupy temporarily the building formerly used by the Armor Clad Mfg. Company. L. Robert Houston is the general manager. It plans to erect a new plant shortly.

It is stated that considerable new equipment will be purchased for the new addition to the plant of the G. Zahner Metal Sash & Door Company, Canton, Ohio.

The McGraw Tire & Rubber Company, East Palestine, Ohio, will enlarge its plant by the erection of a three-story building.

It is announced that the Ward Nail Company, Struthers, Ohio, will double the capacity of its plant. Twelve nail-making machines will be added.

The Cincinnati, Hamilton & Dayton Railroad will expend $33,000 for a new coaling and oiling station, and for other equipment in connection with its shops at Lima, Ohio, including about $7,000 worth of metal-working tools.

Detroit

DETROIT, MICH., July 19, 1915.

The market for machine tools remains steady in this territory and in some lines the buying is heavier. Foreign business does not seem to be an important factor. Inquiry is excellent and its character indicates a broadening of the market. The automobile industry continues to absorb tools and machinery in considerable volume; but no large lists are forthcoming from this source. The copper industry in the Upper Peninsula is the source of orders for some heavy equipment. Only the smaller units in electrical machinery are in much demand. Foundries, especially those engaged in the steel castings trade, are quite busy. Construction work is somewhat below normal for this season.

Glenn & Anheltt, manufacturing machinists and tool makers, Detroit, have acquired a new two-story factory, 52 x 127 ft., and will remodel and enlarge it. The company will about double its present capacity.

The Puritan Machine Company, Detroit, has purchased all of the assets, except the real estate, of the bankrupt Briggs-Detroiter Company, automobile manufacturer, at receiver's sale. It is the present intention of the company to reorganize it and continue the manufacture of motor cars. A. O. Dunk is president.

The McLaren Mfg. Company, Detroit, has been incorporated with $25,000 capital stock to manufacture machinery and screw-making specialties. The incorporators are John P. McLaren, Harry E. Andrews and Raldo C. Brown.

The Detroit Starter Company, Detroit, manufacturer of engine starters, has increased its capital stock from $20,000 to $150,000.

The Detroit Fuse & Mfg. Company, Detroit, manufacturer of electrical devices and fuses, has awarded contracts for the erection of a three-story steel and concrete addition to its plant. The new building will contain about 35,000 sq. ft. of floor space and will cost $60,000. Modern equipment will be installed throughout. The company reports an excellent volume of business and a promising outlook for the year.

The General Aluminum & Brass Mfg. Company, Detroit, manufacturer of aluminum and brass castings, has increased its capital stock from $150,000 to $400,000.

The Abbott Stamping Company, Detroit, has been incorporated with $6,000 capital stock to manufacture steel stampings and enamelings. Charles S. Abbott, F. B. Boileau and B. B. Bebbet are the incorporators.

The Michigan Safety Window Company, Detroit, has been incorporated with $1,000 capital stock to manufacture metal weather strips. H. W. Switzer is the principal stockholder.

The Chevrolet Motor Company, Flint, Mich., automobile manufacturer, has broken ground for the erection of a plant which will be used to manufacture motors exclusively. It has also acquired stock control of the Mason Motor Company and will operate its factory in connection with the new plant. About 20 acres of land adjoining the present plant of this company has been acquired for future expansion.

The plant of the bankrupt Michigan Buggy Company, Kalamazoo, Mich., has been acquired by a syndicate composed of W. B. Smith and H. Walbridge, Toledo; J. B. Shifflitt, Cleveland, and others. The purchasers will engage in the manufacture of automobiles and will completely overhaul the plant.

The Austin Company, manufacturer of automobile axles, Grand Rapids, Mich., heretofore conducted as a partnership by James E. Austin and Walter S. Austin, will be incorporated with a capital stock of $1,000,000.

The Albion Spring & Wire Company, Albion, Mich., has under construction an addition which will cost about $60,000. The company has completed plans whereby its Canadian plant at Windsor, Ont., will be enlarged to double its present capacity. The cost of the improvements at the latter plant will be about $40,000.

The Kalamazoo Vegetable Parchment Company, Kalamazoo, Mich., paper manufacturer, has increased its capital stock from $125,000 to $250,000.

The C. C. Fleckenstein Company, Muskegon, Mich., manufacturer of leather sundries, will erect an addition to its plant and install new machinery.

The Schan Airless Tire Company, Kalamazoo, Mich., has been incorporated with $6,000 capital stock to manufacture rubber tires. Philip Schan is president.

The Champion Ignition Company, Flint, Mich., manufacturer of spark plugs, will enlarge the capacity of its plant by the erection of an addition 60 x 146 ft., two stories. New equipment will be installed and the number of employees increased.

The Consolidated Press & Tool Company, Hastings, Mich., has plans for a new plant and equipment involving an expenditure of $150,000. Other Michigan cities are bidding for the plant.

The Hardie Mfg. Company, Hudson, Mich., has completed plans for a factory. Additional equipment will be installed.

The American Column Company, Battle Creek, Mich., has been reorganized. C. B. Halladay has purchased the interests of F. B. Angell. Mr. Halladay has been elected treasurer and manager. J. C. Hubbard will be advertising and sales manager.

Campbell, Wyant & Cannon, Muskegon Heights, Mich., will start work immediately on the construction of a foundry building, 75 x 175 ft.

The South Park Machine & Supply Company, Port Huron, Mich., has been organized for manufacturing purposes and has purchased the entire business of the Park Mfg. Company and the Gee Cee Company of that city. It will manufacture a line of brass goods and machinery and will also operate a brass foundry.

The Jackson-Church-Wilcox Company, Saginaw, Mich., manufacturer of steering gears, has let contracts for additions to its plant, which will enable it to increase its output 50 per cent.

Cincinnati

CINCINNATI, OHIO, July 19, 1915.

The demand for lathes, both from foreign and domestic customers, continues quite brisk, and deliveries are said to be behind time in many instances. It is currently reported, but not yet officially confirmed, that a large local manufacturer, whose specialty is wood-working machinery, will soon commence building lathes. A number of local machine tool builders received a lengthy list of tools wanted by the Seaboard Air Line Railway, which were to have been purchased July 15, but it is now stated that only a few of the machines were bought, and that new bids will probably be called for at a later date. Orders from the automobile and truck manufacturers are somewhat spotty, and no lists are out from this source.

Interest continues to be centered in the high-speed tool steel situation. Prices have been advanced all the way from 20 to 40 per cent, and practically all agencies report a record-breaking business, as users of tool steels are evidently of the opinion that still further advances are due on account of the tungsten shortage, and they are desirous of covering future requirements. Refrigerating and ice-making equipment is in good demand. Makers of portable electric drilling machines and grinders also make optimistic reports both as to the domestic and foreign trade. Small electric generators and motors are also good sellers, with quite a number of scattered orders received from the South.

The Rich Pump Company, West Front Street, Cincinnati, contemplates doubling the capacity of its plant.

M. R. Carpenter, refrigerating engineer, Pickering Building, Cincinnati, is working on plans for rearranging the plant of the F. C. Stedman Packing Company, Athens, Ohio. Some additional refrigerating equipment will probably be required.

The Standard Oil Company, New York City, announces that it will build a large storage station at Middletown, Ohio. Some tank equipment will be required.

The Davis Sewing Machine Company, Dayton, Ohio, contemplates making an addition to its plant. Details are not yet available.

The Hynes & Grove Pattern Company, Springfield, Ohio, recently organized, has leased quarters in the Shuey Power Building, and will operate a pattern shop. Most of the necessary equipment has been purchased.

The John O. Heinze Company, Springfield, Ohio, has been incorporated with $500,000 capital stock to manufacture a self-starter for automobiles. Space has been secured in the Shuey Power Building.

It is rumored that the Bingham Roller Company, Chicago, Ill., contemplates establishing a branch plant at Springfield, Ohio, for the manufacture of printing press rollers.

The Brunt Tile & Porcelain Company, Columbus, Ohio, has increased its capital stock from $10,000 to $150,000, and will probably add to its manufacturing facilities.

The Kilbourne & Jacobs Mfg. Company, Columbus, Ohio, has recently received an order from Russia for 500 all-steel cars. It has also received a number of inquiries for industrial cars to be shipped to France.

The Barnesville Garage Company, Barnesville, Ohio, has been incorporated with $5,000 capital stock by E. B. Gallaway, and others, and will operate a public garage.

B. H. Martin, Zanesville, Ohio, heads a new company that will erect a plant for the manufacture of composition roofing.

It will be incorporated under the name of the Zanesville Builders Supply Company.

The daily press reports that the American Electric Clock Company, Ashland, Ohio, has made arrangements for moving its plant to Canton, Ohio.

Columbus, Ohio, will receive bids until noon, July 27, for water-tube boilers, grease extractor and mechanical stoker for the pumping station. George A. Borden is director of public service.

Cambridge, Ohio, will receive bids until Aug. 5 for a new pumping plant, etc. The W. J. Sherman Company, Nasby Building, Toledo, is the consulting engineer.

The Central South

LOUISVILLE, KY., July 19, 1915.

Business prospects continue fair and inquiries are being received in satisfactory volume. Most of the orders received the past week have been small; but the prospects are favorable to the development of machinery demand of large proportions. Public utility plants are being built in considerable number, especially in the smaller communities, and equipment demands from this source have been good. Oil engine manufacturers are supplying some of the generating machinery for these plants. Boilers continue to sell fairly well, and electrical equipment is also moving. Most lines of special machinery are rather quiet.

The W. L. Martin Broom & Mop Company, Louisville, has acquired part of the old plant of the Falls City Woolen Mills and is equipping it.

The plant of the United Safety Powder Company, Jeffersontown, Ky., a suburb of Louisville, was destroyed by an explosion last week. The directors state that the factory will be rebuilt.

The Lebanon Lighting Company, Lebanon, Ky., has been organized and will buy machinery for an electric light plant.

The warehouse of the Southern Mill Supply Company, 173 Third Street, Nashville, Tenn., was burned recently with a loss of $40,000. A complete new stock of transmission equipment and power plant supplies will be purchased.

The Watertown Power Company, Watertown, Tenn., is equipping an electric light plant, including a 150-hp. boiler, an 80-hp. boiler, two engines, two alternating-current generators, etc. A. F. Trimble is manager.

The John G. Duncan Company, Knoxville, Tenn., is asking for prices on a second-hand 20-in. band re-saw, a 3 x 6-ft. air receiver for a compressor outfit, and a small second-hand drum for a hoisting pump.

The Continental Piston Ring Company, Memphis, Tenn., has elected the following officers: B. H. Mason, president; W. P. McCadden, vice-president and general manager; R. E. Brown, secretary-treaturer; C. R. Bryant, chief engineer. It has begun the construction of a factory, and will make piston rings for use in automobiles, steam engines, ammonia compressors, water pumps and air compressors. An output of 3500 rings per day is to be provided for.

It has been incorrectly stated that the Jones & Hopkins Mfg. Company and the Smith, Herrin & Baird Mfg. Company, both of Nashville, Tenn., have been consolidated under the name of the latter company. The consolidation has been made under the name of the Jones & Hopkins Mfg. Company.

The Parish Coffee Company, Chattanooga, Tenn., will build a three-story factory building. Motors and conveying equipment will be required.

The Chattanooga Pure Food Company, Chattanooga, Tenn., will need boilers and special equipment for its factory. Edward J. Bedoit is in charge of machinery purchases.

Birmingham

BIRMINGHAM, ALA., July 19, 1915.

The approach of crop yields has created some activity in the demand for cotton gins, and oil mill and compress machinery. Small grain mills are also being built numerously and are calling for outfit. The general feeling is better.

M. J. Gregg, Birmingham, and T. H. McMichael have taken over the Laycock brick plant in Tuscaloosa and announce their intention of building a plant of 4,000,000 to 5,000,000 bricks a year capacity.

The Central of Georgia Railway's compress at Dothan, Ala., was burned with a loss of $75,000. The Atlantic Compress Company is the lessee.

The Helen Lumber Company Mobile, Ala., has been incorporated with a capital stock of $83,000 by Henry Hall, P. Weill and others.

The Pine Bluff Stave Company, Pine Bluff, Ala., has been incorporated by C. H. Montague and others.

The City Furnace Company, Chattanooga, is arranging to equip iron mines near Attalla, Ala., with electrical machinery.

The Alabama Power Company, Birmingham, Ala., will build a steam engine driven electric plant at Guntersville.

The Public Utility Company, Waycross, Ga., will build a 50-kw. electric power plant.

Z. M. Maynard, Forsythe, Ga., will establish an electrically driven ginnery.

The Black River Cypress Company, Sardinia, S. C., has been incorporated with a capital stock of $250,000 by C. P. Gable, Donner, La., and S. Olive O'Bryan, Manning, S. C.

The Interstate Milling Company, Charlotte, N. C., has purchased at site on which to erect a 50,000-bu. grain elevator, etc., at an estimated cost of $60,000.

St. Louis

ST. LOUIS, MO., July 19, 1915.

Dealers at this point are reporting some difficulty in making prompt shipment of tools sought as a result of the increasing business of the St. Louis trade territory. The St. Louis territory, industrially speaking, has recovered more slowly than almost any other section of the country; but it is not likely to be affected by any slump in the war supply demand. No large lists have appeared, but an increasing number of single tools and second-hand equipment is being sought. Collections are reported good and banking conditions easy, with the usual caution in relation to permanent investment.

The Ozark Iron & Furnace Company, St. Louis, Mo., has been incorporated with a capital stock of $60,000 by E. J. Burton, Louis J. Winkler and Thomas H. Galbreath and will equip an iron furnace and smelter.

The Delmar Mfg. Company, St. Louis, Mo., has increased its capital stock from $15,000 to $60,000 and will add to its manufacturing equipment.

The Brokaw-Eden Mfg. Company, St. Louis, Mo., manufacturer of washing machines, etc., has been incorporated with a capital stock of $100,000, an increase from $60,000.

The Peerless Burner & Machine Company, incorporated with a capital stock of $250,000, has been authorized to utilize $50,000 of its capital in a plant at St. Louis.

The Seventh Street Realty & Power Company, St. Louis, Mo., has been incorporated with a capital stock of $12,000 by James A. Stephenson, Thomas P. Plumridge and Horace G. Boedle and will install an isolated electric plant.

The Coahuila Lead & Zinc Company, Wainwright Building, St. Louis, Mo., will increase its capital stock from $100,000 to $150,000 for the purpose of adding to its equipment.

The Nevada Smelting Company, Joplin, Mo., has been incorporated with a capital stock of $40,000 by Gordon Battelle, C. M. Fenton and H. S. Miller and will equip a zinc and lead smelter. The same incorporators have also organized the Cherokee Smelting Company, with a capital stock of $50,000 to equip another smelter.

The Sparkler Mining Company, Kansas City, Mo., has been incorporated with a capital stock of $40,000 by Edward Wilkinson, J. A. Kelly and R. O. Larson and will equip mining property.

The New Emmett Mining Company, Joplin, Mo., has been incorporated with a capital stock of $50,000 by W. N. McDonald, F. L. Johnson and P. C. Pate.

The Simonds-Shields Grain Company, Kansas City, Mo., has increased its capital stock from $100,000 to $250,000 for the purpose of increasing its elevator capacity.

The Campbell Machinery Company, Joplin, Mo., has been incorporated with a capital stock of $16,000 by J. B. Corby, J. E. Campbell and J. B. Rood.

The Boonville Light, Heat & Power Company, Boonville, Mo., has been incorporated with a capital stock of $75,000 by W. A., R. A. and W. E. Sombart and will equip a public service electric plant.

The Prince-Johnson Limestone Company, Kansas City, Mo., has been incorporated with a capital stock of $75,000 by John Price, Fred Johnson and George H. Cope to quarry, manufacture and dress limestone.

The Johnson Furnace Company, Kansas City, Mo., has been incorporated with a capital stock of $10,000 by Guy W. Johnson, Hazel Johnson and M. C. Roddy to manufacture heating furnaces.

The Columbian Steel Tank Company, Kansas City, Mo., has plans for the immediate erection of two factories at a total cost of about $250,000. Andrew A. Kramer, 1605 West Twelfth Street, is president.

Wallace Smith and E. E. Wilson, Mavon, Mo., will equip garage and machine shop to cost about $10,000.

The Eudora Gin & Mill Company, Eudora, Ark., will install machinery for ginning about 75 bales per day. A. Abelman is in charge.

The Arkansas Zinc Company, Hot Springs, Ark., has been incorporated with a capital stock of $100,000 by C. Boyd Huff, O. L. Huff, Frank J. Stutesman and C. D. Harper.

Harrison, Ark., will install waterworks equipment, including one 40-hp. semi-Diesel engine of 350 r.p.m., to cost $8,300. M. A. Earl & Co., Muskogee, Okla., are the consulting engineers.

The Muskogee Fruit Growers & Canning Company, Zufall Building, Muskogee, Okla., will install a cannery of 30,000 cans daily capacity. O. P. M. Butler is president.

Bixby, Okla., will equip an electric light and power plant to cost about $14,000.

The El Reno Gas & Electric Company, El Reno, Okla., will increased in capacity about 100 kw.

A smelter to cost about $500,000 will be equipped at Depew, Okla., by George E. Nicholson, Kansas City, Mo., and others.

An assembling plant to cost equipped about $250,000 will be equipped at once at Oklahoma City, Okla., by the Ford Motor Company, Detroit, Mich.

The Mississippi Fiber Company, Meridian, Miss., capitalized at $35,000, will equip a plant for bleaching raw cotton, and will install about $15,000 of machinery. John H. Hill, Atlanta Ga., is the engineer in charge.

The Tatum Lumber Company, Hattiesburg, Miss., will equip a double band lumber mill of 100,000 ft. daily capacity.

Oxford, Miss., will spend $6,500 increasing the equipment of its generating plant for electric light and power.

The Finkbine Lumber Company, Wiggins, Miss., will install individual electric drive in its new 200,000-ft. mill. Band-saw, lath, stave and molding-making machinery will be included. The 4-saw units will have 200,000 ft. capacity per day of ten hr. Dry kilns, planing mills, and other auxiliary machinery will be installed. W. E. Guild is manager.

The Beaver Dam Lumber Company, Monarch, Miss., P. O. Orett, will rebuild and re-equip its mill, recently burned. About $10,000 of machinery will be needed.

The George Vinson Shingle & Mfg. Company, Berwick, La., will rebuild its plant recently burned with a loss of about $5,000.

The Universal Electric Specialty Mfg. Company, New Orleans, La., has been incorporated with a capital stock of $50,000 by William T. Conery, and others, to manufacture special electrical devices and machinery.

The Otis Mfg. Company, New Orleans, La., importer of mahogany, will equip a pant for manufacturing products from mahogany and other imported woods.

The National Fish, Game, Produce & Ice Company, New Orleans, La., has been incorporated with a capital stock of $50,000, and will equip an ice and cold storage plant to cost $100,000. O. B. DeLord is president and F. F. Philbert, manager.

Texas

AUSTIN, TEXAS, July 17, 1915.

The machinery and tool trade continues very satisfactory. The first bale of cotton of the season was harvested a few days ago and the movement of the staple to market on a big scale will begin soon.

The city commission, Austin, will construct a sewage disposal plant, to cost about $75,000.

The Texas Portland Cement Company, Dallas, has purchased a site near Harrisburg, upon which it will build a plant. The new mill will have an initial capacity of between 300,000 and 400,000 bbl. a day. Oyster shells, found in enormous banks in Galveston Bay, will be used as raw material. The wet process of manufacture will be used. W. R. Bissell is president.

Mayor Campbell of Houston states that plans are under way for the erection of a 1,000,000-bu. grain elevator in that city.

The Cope Gin Company, Karnes City, will build a cotton gin. J. W. Ruchman is a stockholder.

The plant of the South Texas Grain Company, Houston, for manufacturing alfalfa products, recently destroyed by fire, will be rebuilt.

Charles Frerich, Oakville, and associates, will construct a system of irrigation and a pumping plant.

The Louisiana & Rio Grande Canal Company, Brownsville, plans to enlarge its pumping plant and irrigation system so as to water 20,000 additional acres. Its present system covers 30,000 acres.

The Pacific Northwest

SEATTLE, WASH., July 10, 1915.

Merchants from Portland, Ore., report tremendous wheat crops throughout the state, the acreage in most districts running from 25 to 30 per cent in excess of the area tilled last year. The fruit crops are unusually good, but the market is not all that could be desired. The lumber industry in that section is also crippled by lack of sea-going tonnage, and a number of orders are now piled up at the docks. The lumber dealers in the Northwest are anxiously awaiting the award of contracts by several of the big railroads of the East and Middle West, who are now investing in new rolling stock, which will require between 10,000,000 and 16,000,000 ft. of lumber. It is understood that some of the contracts will be let within ten days.

The Walton Machine Works, Spokane, Wash., has been purchased by H. C. Smith, M. Goodwin and F. A. McCanna, of Spokane, who will operate the plant under the name of the Monarch Iron Works. A number of improvements will be made to the plant. The new company will conduct a general foundry and machine trade, making castings for mines, sawmills and buildings.

The Sunset Mfg. Company, Seattle, Wash., has filed articles of incorporation to manufacture mechanical appliances. James Hattley, H. C. Jordan and Theodore E. Ostlund are the incorporators.

The Washington-Portland Cement Company, Seattle, has increased its capital stock to $1,400,000, the additional funds to be used in making necessary improvements.

The Western Milling & Elevator Company, Denver, Col., has announced its intention of constructing a flourmill and elevators in Idaho Falls, Idaho. It is also making plans for erecting grain elevators in Idaho at Pocatello, Twin Falls, Camas, Roberts, Sterling, Dubois, Ione, Newdale and Prairie City.

The Lister Mfg. Company, Tacoma, Wash., will make improvements to its plant. The storage building will be enlarged from 40 x 60 to 40 x 100 ft.

The Montana Flour Mills Company, Lewistown, Mont., will erect a 2000 bbl. flour mill in Great Falls, Mont.

A sawmill with a capacity of 30,000 ft. daily is to be erected in Butler, Washington, by W. H. Dopp, Vancouver, Wash.

The Eqauna Box Factory, Klamath Falls, Ore., has received orders to keep the plant in constant operation. More than 20,000,000 ft. of lumber has been contracted for.

The sawmill and box factory of Edward Johnson, Brewster, Wash., was completely destroyed by fire recently, with a loss of $75,000.

A cold storage plant to cost $150,000 will be built by George L. Clayton, Prince Rupert, B. C.

San Francisco

SAN FRANCISCO, CAL., July 13, 1915.

Eastern conditions are reflected by the continued receipt of inquiries for lathes from that quarter. Inquiries have also been received from the Southwest; but these as a rule are for tools of which this market is already bare. The local trade is practically lifeless. Some demand comes from small repair shops around the country; but most of the larger shops are keeping out of the market entirely. Not much business is in sight for the near future. Wood-working machinery, though quiet, finds rather better demand than a few months ago, and the outlook offers some encouragement. Equipment for mines and smelters continues in fair demand. Inquiry for pumping machinery is fair, but hardly up to the summer average of recent years. Boilers and engines for miscellaneous uses are in good demand. Some fairly large orders for gold dredging machinery have lately been received from Alaska.

Harron, Rickard & McCone, 139 Townsend Street, San Francisco, have completed improvements to their establishment. The offices have been rearranged, and a line of tools, including samples from Lodge & Shipley, Cincinnati Bickford Company, Smith & Mills, A. J. Fay & Egan Company, etc., has been placed on display in the windows.

S. G. Eastman, representing the Niles-Bement-Pond Company, is opening an office and display room at 16-18 Fremont Street, San Francisco.

A new foundry built for the Engineering & Foundry Company at East and Flora Streets, Stockton, Cal., has been completed and the first metal was poured July 8. The company is capitalized at $100,000. J. W. Hannah is president.

E. L. Newhouse, of the American Smelting & Refining Company, states that improvements amounting to about $300,000 are to be made at the Balaklala smelter, Coram, Cal.

The downtown offices of the Union Iron Works have been moved to the Newhall Building, California and Battery Streets, occupying the entire top floor.

The Western States Gas & Electric Company will start work in the fall on improvements to its American River development, including a new 1500-kw. generating unit in the plant north of Placerville, Cal.

Marchant Brothers, formerly of San Francisco, are fitting up an automobile machine shop at Redwood City, Cal.

The board of education, Los Angeles, Cal., will receive bids July 16 for a number of wood-working machines.

The Crown mill of the Sperry Flour Company, Stockton, Cal., is being extensively remodeled, and new machinery will be installed for producing various kinds of stock feed.

Tehama, Cal., is preparing to install a waterworks pumping outfit.

Bids will be opened July 23 for furnishing machine and forge shop supplies for the county high school, Kern County, Cal., for the year ending June 30, 1916.

The Southwest Portland Cement Company is preparing to build a cement plant near Victorville, Cal. Carl Leonhardt, a Los Angeles contractor, is president of the company.

Canada

TORONTO, ONT., July 19, 1915.

Bids will be received by the D. J. Barker Foundry Company, Ltd., Brighton, Ont., up to July 29, for the erection of a foundry building. George Drewry is secretary.

The Pease Foundry Company, Brampton, Ont., will install machinery for the manufacture of shells. Mr. McKinnon is purchasing agent.

W. C. Collett, 7 St. Mary Street, Toronto, Ont., is asking for catalogs and information with regard to cold storage and refrigeration machinery.

The roundhouse of the Dominion Atlantic Railway at Kentville, N. S., was completely destroyed by fire.

The Canadian Western Foundry & Supply Company, Ltd., Calgary, Alberta, has been incorporated with a capital stock of $1,000,000 to manufacture iron, steel, machinery, shells, etc.

Canora, Sask., will install a waterworks plant to cost $17,700. The engineers are Chipman & Powers, Mail Building, King and Bay Streets, Toronto, Ont.

The Municipal Council of Vernon, B. C., will build a new auxiliary pumping station to cost $3,000. One large pump and a 50-hp. motor are required. D. G. Tate is city clerk.

The plant of the Tenino Lumber Company, Tenino, B. C., was totally destroyed by fire with a loss of $60,000.

A light and power system will be installed at The Pas, Man., to cost $50,000. H. H. Elliott is clerk. A waterworks and sewage system to cost $80,000 will also be installed.

The laboratory buidings of the Coniagas Reduction Company, Thorold, Ont., were destroyed by fire with a loss of $10,000.

J. S. Hughes, Mill Village, N. S., is interested in a company which will construct a pulp and paper mill at Selkirk, Man., to cost $150,000.

The sawmill of Robert E. Brooks, Smithville, Ont., was destroyed by fire with a loss of $5,000.

The Davidson Woodworking Factory, Ottawa, Ont., will build a large addition to its plant. Woodworking machinery will be required. L. Henderson is manager.

Z. Charbonneau's sash and door factory on Alice Street, Montreal, Que., was destroyed by fire with a loss of $20,000.

The Board of Control, Toronto, Ont., has instructed R. C. Harris, commissioner of works, to report on the cost and advisability of building municipal car shops.

T. Beaudouin's saw mill at West Broughton, Que., which was totally destroyed by fire with a loss of $8,000, will be rebuilt. Steam power machinery is required.

The Canadian Dadco Company, Ltd., Toronto, Ont., has been incorporated with a capital stock of $75,000 to manufacture gas engines, automobile accessories, tools, etc. Willard C. Farrington, Detroit, Mich.; John T. Fuller, William R. Paul, and others, are the directors.

The Harrison Landry Mfg. Company, Ltd., Montreal, Que., has been incorporated with a capital stock of $50,000 by Andrew H. Landry, Michael Croghan, N. P. W. Currie, and others, to carry on the business of boilermaker, machinist, engineer, etc.

The B. F. Ackerman, Son & Co., Ltd., Peterborough, Ont., has been incorporated with a capital stock of $500,000 by Benjamin F. Ackerman, Edward W. Borbridge, George Robertson, and others, to manufacture harness, trunks, rubber goods, etc.

The Seed Treating Machine Company, Ltd., Stratford, Ont., has been incorporated with a capital stock of $50,000 by John A. McFaden, John R. Macdonald, Robert S. Robertson, and others, of Stratford, Ont., to manufacture agricultural machinery, etc.

The Dominion Saddlery Company, Ltd., Montreal, Que., has been incorporated with a capital stock of $50,000. The provisional directors are Alexandre P. Mathieu, Alfred Bureau, Michael M. Hackett.

The Canadian Steel Products Company, Montreal, Que., has been incorporated with a capital stock of $10,000 to manufacture machinery, iron and steel products, etc., by Jessie Brown, Montreal, and others.

The Garden River Timber Company, Ltd., Toronto, Ont., with a capital stock of $50,000 has been incorporated by Frank Denton, 20 King Street, East; John I. Grover, and others, to manufacture lumber, etc.

The Alton Foundry Company, Ltd., Alton, Ont., has been incorporated with a capital stock of $50,000 by Andrew Doda, 35 High Park Gardens, Toronto, Ont.; J. M. Doda, Alton, Ont.; John M. Deagle, Cataract, Ont., and others, to manufacture foundry products and supplies.

The Canadian Mill Supplies & Steam Specialties, Ltd., Toronto, Ont., has been incorporated with a capital stock of $40,000 to manufacture machinery and supplies for all industries. The provisional directors are Frank J. Hughes, Queen Street, West; Thomas B. Smyth; Duncan P. Cla and others, all of Toronto.

The St. Thomas Construction Company, Ltd., St. Thomas, Ont., has been incorporated by Albert E. Ponsford; Edward A. Horton, F. S. Ferguson, and others, of St. Thomas, Ont., with a capital stock of $40,000 to manufacture shrapnel and high explosive shells and to operate a foundry and machine shop, etc.

The charter of The Toronto Type Foundry Company, York Street, Toronto, Ont., has been extended to include the manufacture of shells, guns and munitions of war general

Government Purchases

WASHINGTON, D. C., July 19, 1915.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, July 13—Schedule 8501, construction and repair, class 61, for four air compressors, f.o.b. works: International Steam Pump Company, $9,000; Ingersoll-Rand Company, $13,000; New London Ship & Engine Company, $10,920; Norfolk Iron Works Company, $9,200.

The commanding officer, Rock Island Arsenal, Rock Island, Ill., will receive sealed proposals until July 28 for furnishing machine tools as follows: Proposal No. 7, one Cleveland Automatic Machine Company model A, or equal, 2 x 2½-in. turret full automatic machine, with oil guard, oil pump, oil feed mechanisms and spare parts; proposal No. 20, one 3-A, 4½-in. spindle, Warner & Swaysey, or equal, universal hollow hexagon turret lathe, with oil pans, pump, parts, etc.; proposal No. 31, two Warner & Swaysey, or equal, 2-A universal hollow hexagonal turret lathes with spare parts; proposal No. 33, one newly improved Racine high-speed metal-cutting machine, No. 7-A, or equal; until July 30, proposal No. 17, four 24-in. double back-geared instantaneous change gear engine lathes, with double plate apron; proposal No. 18, one 32-in. double backgeared instantaneous change gear engine lathe with double plate apron; proposal No. 1 one 36-in. double back-geared instantaneous change gear engine lathe, with double plate apron; proposal No. 25, one 2 in. Ingersoll, or equal, patent face milling cutter grinder, and proposal No. 26, one multiple spindle drilling machine. For further information, it is best to mention the proposal numbers and address the commanding officer.

The commanding officer, Springfield Arsenal, Springfield, Mass., will receive sealed proposals until 2 p. m., Aug. under proposal No. 2, for the construction of one coal storage and coal-handling equipment, consisting of six bins 1000 tons capacity of reinforced steel, one railway track hopper with reciprocating feeder and coal crusher, the equipment to be capable of transferring from cars to bin 30 tons of coal per hour.

The general purchasing officer, Panama Canal, Washington, will receive proposals under file R-1246-H for furnishing one core wire-straightening machine and one magnetic separator.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Aug. schedule 8585, 2¼-in. x 24-in. flat turret lathes, for Norfolk until Aug. 10, schedule 8586, two sets of steam turbine-driven blowers, for Norfolk; schedule 8575, one vertical fire-tube steam boiler, for Mare Island; schedule 8588, one exhaust fan for Washington; schedule 8597, 28 spur-geared chain hoists for Brooklyn.